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SOME THEORETICAL ASPECTS OF HEALTH EDUCATION.¹

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THIS is the first course in health education for school medical officers held in Victoria, and since it is specifically for medical officers I propose to treat the subject from their point of view alone, while still recognizing that there are other equally important viewpoints.

It may prove helpful to attempt to analyse the part which the subject has played in the promotion of the public health in the past and to sketch out the tasks which lie before it in the future; in the course of this I shall not attempt to confine myself to the health or health education of the school child alone, for in matters of health, child and adult are literally one.

This analysis seems the more necessary because some of our colleagues feel that health teaching of a formal variety is something in the nature of high-pressure salesmanship, suspect and better left in the hands of zealous laymen. With this view no one here present will agree; but despite this the medical profession as a whole has

shown little inclination to teach the prevention of disease in compelling style. This may have arisen in several different ways. The doctor may have had no access to the patient in the preventable stage of the disease, or he may have thought that the ailments of family practice were, in the main, not preventable. Further, he may have thought that an occasional remark in the family circle might suffice to influence his patients' attitudes and conduct. Skill in the techniques of group teaching he has rarely had; nor would he welcome the suspicion of self-advertisement that these would entail.

Again, perhaps, the doctor may equate health education and disease prevention with the preventive medicine of his student days. Until recently this was little more than environmental sanitation—that is, "drains"—and therefore in a modern city the business of the health inspector, and in the wide sunlit spaces of our countryside of no importance anyhow.

Now, in the course of my argument I hope to show that none of these views is tenable, and that even if all were tenable then at the last ditch it should be maintained that our profession is in danger of losing a vast store of public goodwill by leaving this field open to others; and beyond the last ditch I would maintain that if health education had no other purpose it would more than justify itself if it tended to produce a public which could make sensible use of so-called "free medicine" and approach the complex emotional and instinctual problems of adult life with a well-furnished mind open to reason.

¹An introductory address to a course in health education for school medical officers, Melbourne, September 3, 1956.

This last may be regarded as the crowning achievement of preventive medicine. The British Ministry of Health has recognized this and has encouraged the appearance of "Health Education" in the curriculum of the medical student.

If I am correct in believing that our population learns little of preventive medicine from our profession, then it would be interesting and important to find out whence its knowledge comes, and if from several sources, then in what proportion from each.

Figure I illustrates the results of such an inquiry carried out in Britain a few years ago in a narrow field of health education—namely, immunization against diphtheria. A very high proportion of this information was carried by word of mouth and by printed matter from the school to the home, and, if my memory serves me, much other information of this character reached my home by the same avenue.

In England, whence we derive so much of our social, medical and educational heritage, the first clear signs of awakening interest in health teaching can be discerned at the time of the South African war. Modern war with its immense appetite for healthy men is always attended by a national stock-taking of this commodity, and the South African war was no exception. The results of the medical examination of recruits came as something of a shock to the public conscience. In the preceding century, Charles Dickens, Simon, Chadwick, General Booth, and others, had described in painful detail the physical decadence and diseases of the poor; now in the early 1900's—a period of great enlightenment—the leaders of the community were shocked to find that the skilled artisan, the sturdy yeoman and even the so-called upper classes were in terms of medical fitness little better off. In brief, the startling figures were that of every five men offering for service two were rejected outright and one was discharged medically unfit within a few months. It may be

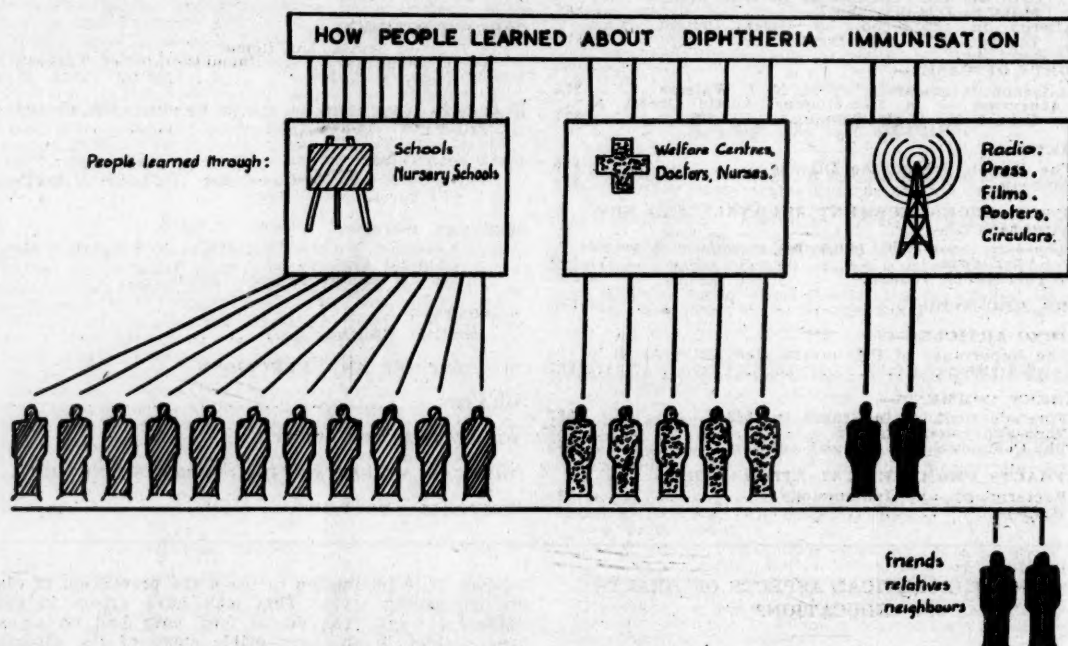


FIGURE I.

At this point a definition of health education would be timely; it is an attempt to impose certain habits, attitudes and values upon people, to foster their practice and to consolidate their use by a reasoned appeal to the intelligence. The last few words—"a reasoned appeal to the intelligence"—put posters, slogans, health weeks and other forms of propaganda into their proper place—that is, a very minor one.

In spite of what has been said, there has been an immense amount of incidental health teaching—for example, by the sick bed, when the patient and often his relations are receptive to admonition, and in the infant welfare centre particularly, and there mostly by the nursing profession.

It is when we view the scene occupied by the school child from six to fourteen years of age and upwards, and by his teachers, that we miss the presence of the physician, and it is precisely here that he, with his prestige and his knowledge, should be able to impress the budding intelligence of the child and to refresh and reinforce the work of the teacher. Indeed, if I may digress for a moment into history, it was the need for this very thing that first gave rise to the school medical service.

interesting to glance at some of the main causes for rejection—all for men below the age of thirty years; they were described as heart weakness, "pneumatic" troubles, anemic condition of the whole body, flat feet and bad teeth. (These last have a familiar ring.)

An Inter-departmental Committee on National Deterioration was set up, and it was decided that if children could be medically examined and they and their parents shown the virtues of prevention of disease, a new and better generation might ensue. The Government agreed, and in 1907 a school medical service was founded; two years later—that is, in 1909—a similar service was founded in Victoria.

I suppose the question that would come immediately to mind is: "Has the measure justified itself?" The answer is surely "yes"; but like so much else in medicine, proof is difficult or impossible.

In surveying the field for preventive medicine, an inspection of the rejection rates for the two World Wars and for our recent national service trainees is full of interest but is too large a task for the present occasion; nevertheless a review of the literature leaves the impression that

health education has played an important part in the raising of physical standards over this troubled period.

If we turn aside for a while from national fitness as seen in young adults and contemplate environmental hygiene as it relates to transmissible and some other diseases, there can be no doubt of the important part played by health education. Diarrhoeal diseases, tuberculosis, diphtheria and nutritional disorders have all retreated, some to vanishing point, and although it is difficult to analyse the various factors at work, public enlightenment (even in the earlier seeking of treatment when the disease is already established) has played an important part.

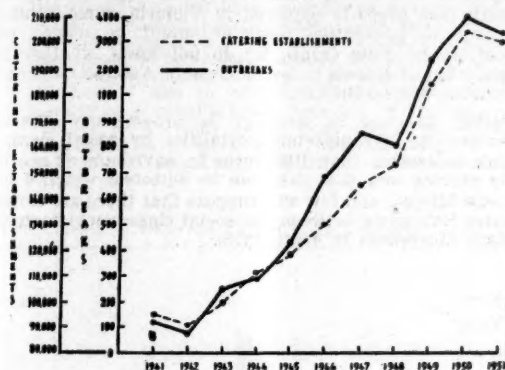


FIGURE II.

In the last analysis, health rules must be either imposed or self-imposed—in other words “police action” versus “cooperation”—and, as I hope to show, the more we put into morbidity rates from now on, the deeper we must pry into the personal life of the citizen, the less effective does “police action” become, and the more necessary does intelligent cooperation appear.

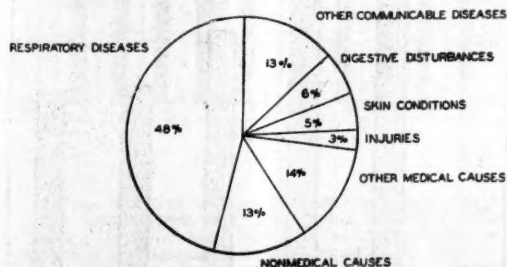


FIGURE III.

If it is agreed that the field of environmental sanitation is now fully mapped and only waits on peace, prosperity and some advances in the control of the viruses, then we must turn our attention to what remains. That plenty remains is shown by Figure II, a graph of food poisoning in England which we shall soon be able to match here—an immense though elementary field for health education.

The burden of medical practice, the expansion of hospital building and the great governmental medical services are further proof that plenty remains, but to plan wisely more accurate guides are needed. We have a fairly accurate picture of the nature of diseases which cause absenteeism among school children; but as I have said, health education aims at more than reducing sickness in one age group alone (Figure III). In Victoria we are unfortunate in that we have never had a survey of the general population upon which to base our plans, and we are sadly in need of “a bill of morbidity”. Death rates,

notifiable disease rates, hospital admissions and private practice figures are all biased in one way or another, and fallacious as measures of the day-to-day ailments of the public. The best that can be done is to turn to England again, where a great deal of time and money has been spent on this subject; I refer to the sickness survey which was carried on from 1944 to 1948 by the Central Office of Information. In the course of this survey a fresh group of 3000 people, carefully chosen to display a balanced section of the population, was interviewed each month, and their ailments, trivial, slight and severe, were carefully recorded for the previous eight weeks.

One's first impression is that of incredulity that a random sample of people could have really suffered in such numbers in the course of a few weeks—though a family man might be easily persuaded of its truth. A total of 37,500 individuals interviewed in the course of the survey recorded 35,000 disabilities, begun or recurring in

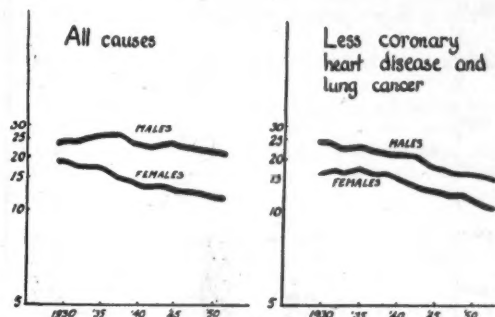


FIGURE IV.

Mortality in middle age, 1928 to 1953.

the two months preceding the relevant interview, and from the mass of statistics here are the commonest complaints:

Febrile cold	8000
Influenza	800
Psychoneurosis	1300
Naso-pharyngitis	1300
Chronic bronchitis	600
Diseases of teeth	1000
Dyspepsia	2500
Constipation	650
Disorders of menstruation	750
Skin diseases	400
Rheumatism	3700
Headache	4500
Backache	500

The notifiable fevers totalled 26. All the above-mentioned disorders add up to 25,000 incidents, so that a further 10,000 are left, divided sparsely over 175 other named diseases or symptoms.

If a Victorian sickness survey disclosed similar figures we should have good cause to interrogate ourselves closely as to whether our present health education and preventive medicine were worth while. Can education influence the 8000 feverish colds? What disorders of conduct lie at the back of 2500 cases of dyspepsia? Even a miniature social survey would throw some light on our way.

We are all well aware that the past half century has seen a continuous decline in male death rates in middle life. This has now been halted by the activities of three previously obscure disorders—coronary disease, duodenal ulcer and carcinoma of the bronchus; all these are now far more prevalent than the rising age structure of our population could explain (Figure IV).

There is much evidence to show that two at least of these are not diseases of the environment but (to coin a word) of the “invironment”, and if our clinical physicians can devise preventive measures, these can be imposed only by prolonged and careful education commencing far back

in the individual's career and influencing his way of life to a great depth.

For example, there is a considerable weight of evidence that premature interruption of breast feeding is correlated in some way with the occurrence of breast cancer a decade or two later. If there is truth in this, would it be wrong for the School Nursing Service to teach our fifteen or sixteen year old the structure and function of the breast, so that when they feel in later life their instincts being overcome by social and economic necessity they will have the deep-seated knowledge and conviction to combat it?

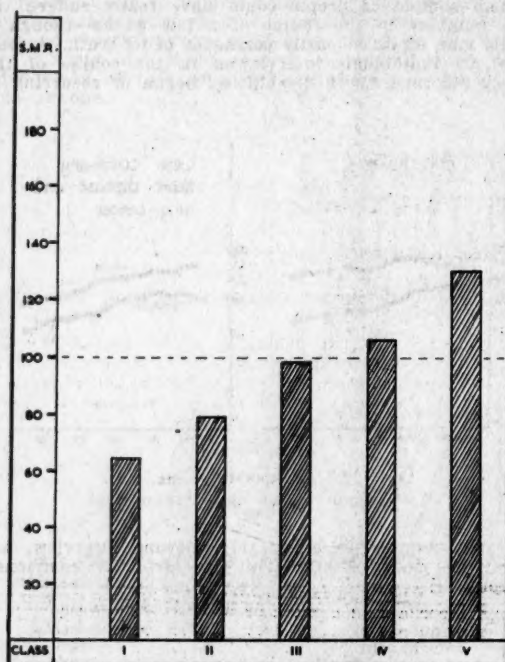


FIGURE V.

Uterus: social distribution of standardised mortality at ages twenty to sixty years from cancer; married women, 1930 to 1932. The height of the hatched columns represents standardised mortality ratio of married women.

I must refer very briefly to the genesis of emotional, mental and the so-called psychosomatic disorders. In these fields there has been a flood of evidence in recent years that the basis for their adult appearance is laid in early childhood—indeed, in some cases in infancy. In consequence, their prevention calls for slow, orderly and penetrating indoctrination over the formative years, long before there is any hint of an incipient disorder. Concurrently with this, the parents must be carefully taught—and here access should be available to the adult groups associated with our schools.

In an attempt to show by means of statistics that there is a causal element in many diseases which is amenable to educational influences, I will make use of some work done, all too infrequently, by the British Registrar-General. Figures V and VI set out the standard mortality ratios under five social classes for cancer of the uterus and cancer of the breast. What predisposes the wives of unskilled labourers to cancer of the uterus and the wives of professional men to cancer of the breast?

Military experience has shown us abundantly that there are few disease hazards that cannot be reduced or even overcome by training—that is, education—and one must believe this to be true in the civilian sphere. By this I mean to imply that if poverty is a cause of disease, then

education can modify its effects in the same measure as military training can modify the effects of unhygienic conditions in war.

Figure VII shows the standard mortality ratios for carcinoma of the upper part of the alimentary tract—much higher for social Class V than for social Class I; whatever the causal factor at the level of the stomach, it has expended its evil influence by the time the lower end of the bowel is reached. Can this factor be ill-cooked food, or purulent gums or excessive beer-drinking? In any of these cases health education would have a dominant place in prevention.

I believe that if this field, where sociology and medicine overlap, was properly explored in Victoria, some valuable advances in preventive medicine might be made; and indeed, to be quite frank, we do not know whether the distribution of disease by social class in Australia remotely resembles that in Britain.

Factor analysis in aetiology is proverbially difficult. Nevertheless, in comparing mortalities by social class, it is fair to assume that differences in environment are the main factors, and that they can be detected, weighed and perhaps altered, and few will suppose that there are serious genetic differences between the social classes which should explain differences in death rates.

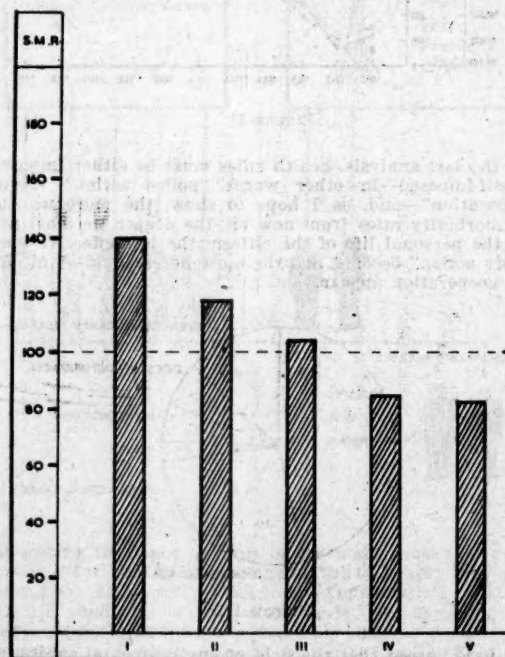


FIGURE VI.

Breast: social distribution of standardised mortality at ages twenty to sixty-five years from cancer; married women, 1930 to 1932. The height of the hatched columns represents standardised mortality ratio of married women.

If defects of environment are the cause of the greater prevalence of, say, coronary disease in Class I, then health education can alter them, and if the defects lie in the emotional life of that class, then education in that direction is even more imperative.

Let us be quite sure that if our profession does not give the public guidance, then the faddists, cultists or commercial interests will. The following paragraphs from *The Times* (1954) are relevant in this connexion:

It is a much publicised and accepted fact that the health of the nation has improved in the present century. A growing social conscience which has demanded certain standards, especially for children; the stimulus of two major wars, which has drawn attention to nutrition; the development of methods of preventing infection and of more rapid and successful treatment have all contributed to the raising of health standards. Progress, however, has been mainly in physical health, and there is increasing awareness of the importance of social, emotional, and even economic conditions which influence the development of the individual person into a fully balanced and healthy personality.

It was also recognised that the smooth working and fullest use of the health services as envisaged under the recent Act can only be achieved if there is intelligent cooperation by the public. Such ideas are of the greatest importance for educators, since they underline the necessity for a new outlook on the training and development of the child from birth and the need for thinking of him in his total social setting, and not merely as a receptacle for learning in the classroom. Further we are only at the beginning of the study of the underlying motives which influence the child or the adult in the formation of attitudes and habits which affect health.

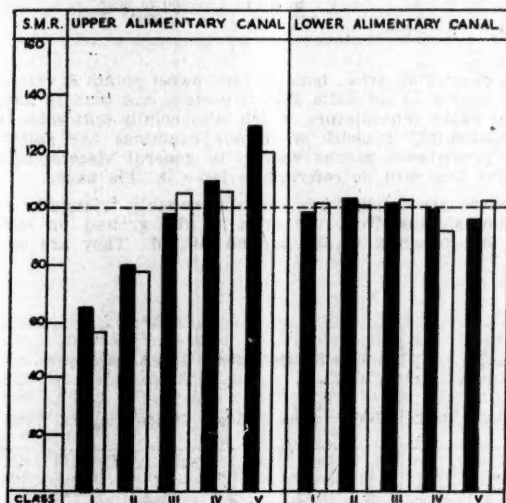


FIGURE VII.

In the training colleges attempts are being made to make future teachers aware of this broader concept of health. It is no easy task. In education there is the tendency to compartmentalize knowledge; and in the modern health education course the ideas put before the student come from such disciplines as physiology, psychology, sociology and others.

While it is agreed that the teacher in preparation must be made aware of the new outlook on health, how this is to be put into practice in the school is also still the subject of debate. That at school the child should grow into a whole healthy human being is self-evident, but the way in which this can be done is still ill-defined.

It is true that whether there are set lessons or not, unless at least one person in a school is actively concerned with health, what is everybody's business too often becomes nobody's business.

The widening of health education in the training colleges has also emphasised the necessity of at least one member of the staff being alive to the need to co-ordinate the different aspects of education which are concerned with health. It is also necessary for members of training college staffs whether initially scientists, specialists in physical education, or others to be aware of their own one-sidedness and of the growing need for co-operation between educationists and those trained in medicine.

Outside the school or college there are many agencies which influence the public about health. The maternity and child welfare services have had an enormous influence on the expectant mother and the young child; a body such as the Central Council for Health Education carries on much of its work with adults and young people through local authorities; while some local authorities now employ health education officers who work in all fields. There is also the Press, which puts out an enormous amount of information on health, including millions of advertisements a year which offer quick cures for all ills.

Nowhere, however, on this side of the Atlantic has there ever been any serious full-scale preparation or training for work in health education.

Conclusion.

I should like to resume in a few sentences some deductions from this very inadequate address.

1. There is an immense amount of recorded and unrecorded sickness in our population which is the future field for prevention.

2. We need more precise information about it which only a social survey can supply.

3. The schools are the ideal place to influence by slow and deep teaching the future conduct of our people.

4. We need teachers, and teachers of teachers, and in this connexion a further revision of the medical student's syllabus.

5. Finally we need a central repository of teaching material—central, so that every interested body has access to it, and so that each succeeding effort is not so much an evanescent campaign as a moving barrage of health education.

Reference.

Times, The (1954), Education Supplement, 113.

REPORT ON A MALARIA SURVEY IN THE SEPIK DISTRICT.

By W. PETERS, M.B., B.S., D.T.M. & H.,
and H. STANDFAST, B.Sc.,

*Malaria Section, Department of Public Health,
Territory of Papua-New Guinea.*

In comparison with that of the other malarious parts of the world, the extent of our knowledge of malaria in the South-West Pacific is very limited. The urgent need for the extension of investigations into the epidemiology and control of malaria in the Territory of Papua-New Guinea is well recognised. Black (1955) summarized the present status of our knowledge and pointed out a number of problems still awaiting clarification. One of these problems is the behaviour of the *Anopheles punctulatus* complex of mosquitoes, the main vectors of malaria in this Territory, particularly in relation to the potential of residual spraying of the chlorinated hydrocarbons as a control measure. A further problem is the clarification of the degree of group tolerance in the community.

The present survey was carried out in the course of selecting a site for the establishment of a pilot project for malaria control by residual spraying. The Sepik district is in the north-west corner of the Trust Territory of New Guinea and is notorious for the severity of the malaria endemic there and for the high mosquito densities, especially along the Sepik River flats. Wewak, the district headquarters, is situated on the coast, and was notorious during the last war as a focus of "Atebrin"-resistant *Plasmodium falciparum* (Fairley, 1946). Mackerras and Aberdeen (1946) reported a survey carried out at Wewak on 378 refugee Papuans, 200 Japanese and 524 Australians. The Papuans originated from coastal and island villages near Wewak and others on the foothills of the Prince Alexander range.

The areas investigated between April 23 and 27, 1956, were as follows: (i) Wewak: Brandi boarding school, 10 miles east of Wewak; Boram aid post orderly training school, four miles east of Wewak. (ii) Maprik: Villages Maprik Numbers 1 and 2, and Sorogum, 40 miles west-south-west of Wewak. (iii) Kunchingini: People visiting the Roman Catholic church from surrounding villages (11 miles south of Maprik). (iv) Burul: Day and boarding school children (mainly from villages along the Sepik river) and a few older inhabitants (30 miles south of Maprik and three miles north of the Sepik river). Maprik and Kunchingini provided the majority of subjects for clinical examination.

Description of the Area.

Wewak is situated on the flat coastal strip of the Sepik district which gives rise to the Prince Alexander mountains on the south. This range drops sharply towards Maprik, which is situated in undulating foothills, mainly limestone of Upper Tertiary origin, stretching from the south of the range towards the Sepik plains. Maprik itself is at an altitude of 600 feet. The surrounding villages are situated on the tops of small ridges and hills, with abundant vegetation and water on and between the hills. The population in the Maprik subdistrict is one of the densest in the Territory (about 26,000 people within one day's walk of Maprik), and forms fairly large village communities, each with its own *Tamberan* or cult house.

About 10 miles south of Maprik the foothills flatten out and give way to flat savannah country on Pleistocene deposits, with fingers of fringing forest along the water-courses. These plains extend south for about 80 miles to the Sepik river itself, and beyond for a considerably greater distance. In this plains area the population is much less dense, but also lives mainly in village groups frequently close to or within the fringing vegetation. Kunchingini is situated near the northern extremity of

these flats, and Burui to the south, about three miles north of the river. Communications are by air or by jeep road between these points. From Burui southwards across the river the country is composed of grassy swampland on the recent alluvial deposits formed in the New Guinea "central depression".

The inhabitants of this region follow various modes of life, which in turn influence their diet. The riverine people are fishermen, who probably have a diet of high protein content and are a very fit and vigorous people. The foothills villagers are mainly farmers and grow the usual

TABLE I

Group.	Description.	Approximate Density per Cubic Millimetre (as Ganged by the Leucocyte Count).
Nil	No parasites on whole film	—
1	<1 parasite: 100 fields	<8
2	1:100 to 1:10	8 to 80
3	1:10 to 1:1	80 to 800
4	1:1 to 10:1	800 to 8000
5	>10:1	>8000

crops of such an area—banana, taro, sweet potato *et cetera*. They appear to eat little animal protein and tend to have rather flabby musculature, which is especially noticeable in the abdominal muscles when one examines the spleen. This predisposes parous women to general visceroptosis, a point that will be referred to later in this paper.

Houses are fairly large, usually roughly triangular in section, sloping from the crest to the ground on each side and tapering to the ground behind. They are con-

TABLE II.
Spleen Indices.

[illegible]

TABLE III.
Parasite Indices.

Locality.	Age Group. (Years.)	Number Examined.			Crude Parasite Rate (All Species).			Average Parasite Density.		
		Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Maprik 1 and 2 Sorogum	<2	6	14	20	100.0	78.6	85.0	3.8	4.1	4.0
	2 to 4	11	16	27	81.8	93.8	88.9	3.1	3.7	3.5
	5 to 9	32	27	59	81.3	77.8	79.7	2.1	2.6	2.3
	10 to 14	3	8	11	66.7	62.5	63.6	1.5	1.4	1.4
	15 to 19	4	13	17	75.0	46.2	52.9	2.7	1.5	1.9
	>20	80	91	171	55.0±5.6	46.2±5.4	50.8±3.8	2.7	1.9	1.8
	Total	136	169	305						
Kunchingini	<2	33	35	68	84.8	88.6	86.8	3.7	4.1	3.9
	2 to 4	12	10	22	100.0	100.0	100.0	3.7	3.3	3.5
	5 to 9	55	24	79	80.0	70.8	77.2	1.9	2.7	2.2
	10 to 14	18	22	40	66.7	72.7	70.0	1.9	2.4	2.2
	15 to 19	10	—	10	60.0	—	60.0	2.2	—	2.2
	>20	40	—	40	62.5	—	62.5±7.7	1.5	—	1.5
	Total	168	91	259						
Burui	<2	—	—	6	—	—	80.0	—	—	2.7
	2 to 4	—	—	2	—	—	100.0	—	—	4.0
	5 to 9	—	—	24	—	—	54.2	—	—	1.7
	10 to 14	—	—	22	—	—	40.9	—	—	2.2
	15 to 19	—	—	5	—	—	60.0	—	—	2.3
	>20	—	—	18	—	—	72.2	—	—	1.9
	Total	—	—	80	—	—		—	—	
Wewak (Brandi)	<2	—	—	—	—	—	—	—	—	—
	2 to 4	—	—	—	—	—	—	—	—	—
	5 to 9	22	—	—	36.4	—	—	1.1	—	—
	10 to 14	26	—	—	30.8	—	—	1.3	—	—
	15 to 19	38	—	—	34.2	—	—	2.3	—	—
	>20	6	—	—	50.0	—	—	2.7	—	—
	Total	92	—	—	—	—	—	—	—	—

structed of sticks and palm or grass thatch with mud floors. Cooking is carried out in the house, and pieces of meat are often suspended over the fire to be smoked. Domestic animals—pigs, dogs and chickens—live in the same houses. There are no windows, but a fair amount of light infiltrates through the small doorway and through the thatch.

The climate is tropical, with some rain all the year round, but a drier season corresponding to the south-east monsoon. The average annual rainfall is 80 to 90 inches. Temperatures vary little with season and average about 95° F. maximum and 78° F. minimum.

TABLE IV.
Parasite Rates of Children Aged Five to Fourteen Years.

Locality.	Number of Children Examined.	Parasite Rate. (Percentage.)	Standard Error.
Maprik	70	77.1	±4.2
Kunchingini	119	74.8	±4.3
Burui	46	43.4	±7.3
Brandi	48	33.3	±6.8

Methods.

A clinical and entomological survey was made, comprising the examination of spleens and blood and the collection of adult and larval mosquitoes. The subjects were examined in the prone position with the knees flexed. Spleen sizes were classified by the Hackett system, as recommended by the World Health Organization (1951). No record was kept of the liver size.

Thick blood films of approximately the same size were taken, 10 or 12 to a slide. The quantity of blood was greater than that used by Mackerras and Aberdeen (1946), who made standard drops of approximately one cubic

millimetre. The dried films were stored unstained for several weeks and then stained by Shute and Maryon's (1955) modification of Giemsa's stain, after our return to base. The stained films were examined for a minimum of five minutes each under the one-twelfth-inch oil immersion lens and six magnification eyepiece. In those containing few or no parasites the whole film was searched. Parasite densities were judged very approximately in relation to the number of fields examined and classified as shown in Table I.

All clinical examinations were carried out during daytime. Microfilaria rates therefore are probably only a

TABLE V.
Spleen Indices of Children Aged Five to Fourteen Years.

Locality.	Number of Children Examined.	Spleen Rate. (Percentage.)	Standard Error.	Average Enlarged Spleen.
Maprik	81	95.1	±2.4	2.8
Kunchingini	131	91.6	±2.4	2.3
Burui	49	79.6	±5.8	2.2
Brandi	56	87.5	±4.4	2.4

proportion of the true occurrence rate of *Wuchereria bancrofti*. All the smears were reexamined under the low power of the microscope to detect any microfilaria that might have been missed by examination of only a section of any film for malaria parasites.

Mosquito larvae were collected from various breeding sites, preserved in Amann's lactophenol (Smart, 1943) and later mounted in polyvinyl-lactophenol (Smart, 1943) for study. Adult mosquitoes were captured by sucking tube and killed and pinned on the spot. They were sought biting outdoors and at rest indoors both in day and night captures.

TABLE VI.
Parasite Species.

Locality.	Age Group. (Years.)	Parasite Species: Number Seen.					Parasite Ratio: Percentage of All Infections.			
		<i>P. falciparum</i> .	<i>P. vivax</i> .	<i>P. malariae</i> .	Mixed.	Doubtful.	<i>P. falciparum</i> .	<i>P. vivax</i> .	<i>P. malariae</i> .	Doubtful.
Maprik 1 and 2 Sorogum	<2	7	—	—	9	1	45.2	25.8	25.8	3.2
	2 to 4	5	—	—	15	1	42.2	20.0	35.6	2.2
	5 to 9	11	9	8	8	11	28.8	25.4	27.1	18.6
	10 to 14	—	—	4	1	2	0.0	12.5	62.5	25.0
	15 to 19	3	1	1	1	3	23.0	15.4	33.5	23.0
	>20	10	16	30	12	18	12.5	22.1	48.1	17.3
Kunchingini	<2	18	6	2	31	2	44.7	31.1	22.3	1.0
	2 to 4	5	1	4	12	—	41.7	19.4	38.9	—
	5 to 9	13	21	9	9	—	27.1	41.4	18.6	12.0
	10 to 14	7	8	3	4	6	33.3	30.3	18.2	18.2
	15 to 19	2	1	1	—	2	33.3	13.7	16.7	33.3
	>20	3	3	10	—	9	12.0	12.0	40.0	36.0
Burui	<2	3	2	—	—	1	66.6	—	—	33.3
	2 to 4	—	1	—	1	—	100.0	—	—	—
	5 to 9	11	1	—	1	7	14.3	7.6	23.6	50.0
	10 to 14	13	2	—	1	5	20.0	10.0	20.0	50.0
	15 to 19	2	1	1	—	—	33.3	33.3	33.3	—
	>20	5	3	2	2	5	33.3	26.8	6.7	33.3
Brandi	<2	—	—	—	—	—	—	—	—	—
	2 to 4	—	—	—	—	—	—	—	—	—
	5 to 9	3	1	2	—	2	37.5	12.5	25.0	25.0
	10 to 14	3	—	1	—	4	37.5	—	12.5	50.0
	15 to 19	7	1	2	—	3	53.8	7.7	15.4	23.1
	>20	2	—	1	—	—	66.6	—	33.3	—

Clinical Findings.

Spleen Indices.

The spleen indices obtained are shown in Table II.

The tendency to viscerotoposis of the adult parous women in Maprik has already been noted. In such women, especially *multiparae*, it was often difficult to decide whether the spleen was enlarged or not, and if it was to assess the degree of splenic enlargement. It was frequently found possible to palpate right over the upper pole of the spleen which was "floating" low down in the abdomen. The results for the Maprik group of villages show a significant difference in the spleen indices between adult men and women ($\chi^2 = 19.25$, $P < 0.001$), and it is thought that this is the explanation for this apparent difference rather than any difference in the parasitic status. The spleen rate of adult males in all the localities was high, but approximately equal.

Parasite Indices.

Table III shows the parasite rates and parasite densities of all localities.

The parasite rate of adult males and females in the Maprik group is similar, in contrast to the divergence seen in the spleen rate. The adult parasite rate generally is high, and corresponds roughly to the high spleen rate. This is in contradiction to the findings of Mackerras and Aberdeen (1946), and other workers, who recorded a high

adult spleen rate but a low parasite rate. The parasite density drops rapidly after the age of about four years. The highest counts were seen in the children aged under four years (see later).

The parasite rates of children aged five to fourteen years in Burui and Brandi are significantly lower than those in Kunchingini or Maprik (Table IV). (If these are taken in two groups, $\chi^2 = 36.1$, $P < 0.001$.)

In Burui and Brandi school children showing symptoms of fever receive a schizonticide, although in neither place is regular suppressive therapy given. It is probably the repeated treatment of mild symptoms that has produced an over-all reduction of the parasite rate in these children, although there is possibly no statistically significant decrease in the spleen rate (Table V). (When these are taken in two groups, $\chi^2 = 4.4$, $P < 0.05$.)

Parasite Species.

Species identification was uncertain in many films when only a few young schizonts were present. Mackerras and Aberdeen (1946) commented on the presence of well-developed forms of *P. falciparum* trophozoites in the blood of young children and infants. This observation was confirmed in the present series, but apart from this no outstanding morphological features were recorded. The species are tabulated in Table VI.

All three species of *Plasmodium* were present in all age groups (*P. ovale* was not detectable by the methods

TABLE VII.
Multiple Infections at Different Ages.

Locality.	Under Four Years.			Over Fifteen Years.		
	Total with Parasites.	Two Species.	Three Species.	Total with Parasites.	Two Species.	Three Species.
Maprik	41	13	11	94	10	3
Kunchingini	81	23	15	31	0	0

TABLE VIII.
Gametocyte Rates.

Age. (Years.)	Maprik.			Kunchingini.			Burui.			Brandi.		
	Number Examined.	Percentage of All Blood Samples.	Percentage of Positive Blood Samples.	Number Examined.	Percentage of All Blood Samples.	Percentage of Positive Blood Samples.	Number Examined.	Percentage of All Blood Samples.	Percentage of Positive Blood Samples.	Number Examined.	Percentage of All Blood Samples.	Percentage of Positive Blood Samples.
<2	20	50.0	58.8	63	27.9	32.2	6	—	—	—	—	—
2 to 4	27	34.0	37.5	22	13.2	18.2	2	—	—	—	—	—
5 to 9	59	25.4	31.9	79	15.2	19.7	24	8.5	15.4	22	9.1	25.0
10 to 14	11	0.0	0.0	40	17.5	25.0	22	9.1	22.2	26	—	—
15 to 19	17	11.8	22.2	10	10.0	16.7	5	20.0	33.3	38	8.6	30.0
>20	171	11.8 ± 2.5	23.2	40	20.0	32.0	18	11.1	15.4	6	—	—
Total	305	18.4	29.5	259	19.8	25.4	80	9.1	16.3	92	5.4	15.6

used here). *P. falciparum* was the commonest species in infants and young children, in whom the parasite density reached high levels. *P. malariae* was the dominant species in adults in Maprik and Kunchingini. Mixed infections were common in all age groups, but especially in children (Table VII).

Gametocyte Rates.

The gametocyte rate of all age groups is shown in Table VIII. Although these rates are high, the gametocyte density was not recorded. It was held by Mackerras and Aberdeen (1946) that the infants and young children formed the major part of the pool of infection for mosquitoes. The present figures do not contradict their findings, since no account was taken of the gametocyte density and the minimum effective gametocyte density required to infect the mosquito. In Maprik, for example, $11.8 \pm 2.5\%$ of the adult population carried gametocytes, but the densities were generally low, probably too low for them to be effective carriers. The highest gametocyte densities were noted in the youngest children and infants.

The gametocyte species were as shown in Table IX.

Table X shows the percentage of all infections with the three species in which gametocytes were seen.

Gametocytes were present in about one-third of all infections in each of the species.

Infant Parasite Rate.

The infant parasite rate is a very sensitive index of the degree of transmission in a community, as was pointed out by Macdonald (1950, 1951). The parasite rate and spleen rate for Maprik and Kunchingini were as shown in Table XI for infants aged under one year.

Very heavy infections were seen in many of these infants, even very young ones, as the following examples show:

CASE 81.—The infant was aged ten weeks, the spleen size was 4. The parasites present were *P. falciparum*, *P. vivax* and *P. malariae* (50+ per field; grade 5), and *P. falciparum* and *P. vivax* gametocytes.

CASE 167.—The infant was aged two months, the spleen size was 4. The parasite present was *P. falciparum* (80+ per field; grade 5).

CASE 176.—The infant was aged two weeks, the spleen size was 0. *P. vivax* was present (grade 3).

CASE 207.—The infant was aged three weeks, the spleen size was 3. The parasites present were *P. vivax* and *P. malariae* (grade 4).

CASE 209.—The infant was aged one week, the spleen size was 4. The parasites present were *P. falciparum*, *P. vivax* and *P. malariae* (grade 5).

CASE 210.—The infant had been born prematurely and was aged two weeks; the spleen size was 3. The parasite present was *P. vivax* (grade 2).

CASE 209 is strongly suggestive of congenital malaria. Mackerras and Aberdeen (1946) also noted "a suggestion that many infants may be born with large spleens".

A further analysis of the parasite rate of infants aged up to two years is tabulated below (Table XII). The total numbers seen in this survey are too small to give statistically valid figures, but they do give a rough indication of the build-up of parasitaemia in this section of the community.

Microfilaria Rates.

The figures in Table XIII show the number of blood samples, taken in the daytime, that contained microfilaria of *W. bancrofti*.

The youngest age at which microfilaria were present was twelve years. Only three of 32 "positive" specimens of blood were from people aged under twenty years. Up to six microfilariae were recorded in a single smear. The apparent difference in rates between the sexes is possibly not statistically significant ($\chi^2 = 4.8$, $P < 0.05$).

Entomological Findings.

Adult mosquitoes were captured with sucking tubes in all the localities except Kunchingini. The collectors and other volunteers were used as bait in day and night captures. A number of specimens were taken resting or flying in houses.

TABLE IX.
Gametocyte Species.

Age Group. (Years.)	Maprik.			Kunchingini.		
	Number of Infections with			Number of Infections with		
	<i>P. falciparum</i> .	<i>P. vivax</i> .	<i>P. malariae</i> .	<i>P. falciparum</i> .	<i>P. vivax</i> .	<i>P. malariae</i> .
<2	2	5	9	7	10	8
2 to 4	7	—	9	—	2	2
5 to 9	2	9	4	2	4	6
10 to 14	—	—	—	—	3	3
15 to 19	—	—	7	—	—	1
>20	10	3	—	2	—	6
Total	21	25	30	11	19	26

In addition to the collections made at the time of the survey, further material has been examined which was collected by two Papuan collectors since that time. These men make regular visits to fixed catching stations in and around Wewak. Table XIV lists all the adult collections.

A. punctulatus Donitz and *A. kollensis* Owen were dominant inland at Maprik and Burui, where they occurred in moderate numbers as judged by these collections. On

The Sepik plains area round Burui is an extensive breeding ground particularly for *Taniorhynchus* (*Mansonioides*) *uniformis* Theobald, which breeds there in enormous numbers and plagues the inhabitants at all times of the day and night. It was impossible to stand anywhere outdoors during our visit even in the early afternoon sunlight without being attacked by hordes of these mosquitoes as well as by appreciable numbers of Anophelines.

Few larval collections were made on this survey, and these were brief random collections only. At Maprik *A. punctulatus* was found breeding in wheel ruts exposed to the sun and covered with a mat of filamentous green algae. It was also taken among stones at the edge of the river with no vegetation and clean flowing water. Collections are now being made regularly at Wewak and so far have produced the species shown in Table XV.

Discussion.

Black (1955) has made the following statement:

It is doubtful if holoendemic malaria, as seen in Africa, occurs in this area, and insufficient detailed observation has been made to determine whether the implications from the classification of spleen rates are the same in this area as, for example, in Africa.

Wilson *et alii* (1950), in a review of hyperendemic malaria, defined hyperendemicity as a "state demanding for its production such an intensity of transmission that a high

TABLE X.

Gametocyte Incidence in Specimens of Blood (Maprik and Kunchingini Together) Containing Asexual Forms of Plasmodia.

Species.	Total Infections.	Number of Specimens with Gametocytes.	Percentage of Specimens with Gametocytes.
<i>P. falciparum</i>	96	36	37.5 ± 4.9
<i>P. vivax</i>	142	44	31.0 ± 3.9
<i>P. malaria</i>	147	56	38.1 ± 4.0

the coast *A. farauti* Laveran was by far the commonest species, and occurred there in large numbers. This species is a facultative brackish-water breeder, and has abundant opportunity for breeding in the extensive mangrove swamps and brackish lagoons of the coastal belt.

TABLE XI.

Infant Parasite and Spleen Rates.¹

Locality.	Spleen.				Blood.		
	Number Examined.	Spleen Rate. (Percentage.)	Average Enlarged Spleen.	Average Spleen.	Number of Specimens Examined.	Parasite Rate. (Percentage.)	Gametocyte Rate. (Percentage of Positive Findings.)
Maprik	17	88.2	3.1	2.7	15	80.0	33.3
Kunchingini	54	92.7	3.2	3.0	54	83.3	33.3

¹ The species seen were as follows: *P. falciparum*, 45 cases; *P. vivax*, 33 cases; *P. malaria*, 23 cases; doubtful, three cases. There were 24 single infections, 13 double infections and 17 triple infections.

An important finding was a single female *A. karwari* James during a night collection at Burui. This is the first record of this species east of Dutch New Guinea, where it is a recognized vector in the Hollandia area with a sporozoite rate of 1.1% (up to 3.1% in 128 specimens—

degree of tolerance to the effects of reinfection is induced in those who experience its effects over a number of years. The frequency of transmission that is necessary to induce this state is almost certainly not less than 30 times a year, and may amount to 100 or more times". They associated

TABLE XII.

Parasite Rate of Infants Aged up to Two Years.

Mean Age in Days.	Number Examined, All Localities.	Crude Parasite Rate (Percentage), All Species.	Parasite Rate. (Percentage) by Species.		
			<i>P. falciparum</i> .	<i>P. vivax</i> .	<i>P. malaria</i> .
30	36	72	50	33	19
140	12	33	75	42	25
165	9	100	100	56	33
255	18	100	92	62	38
375	11	91	82	18	27
540	11	91	82	36	36
720	18	89	67	39	33

Metselaar, 1955). It is a potentially dangerous vector of malaria and filariasis of Indo-Malayan origin, and its spread eastwards into this territory must be carefully watched.

Anophelines were found resting indoors at Burui in the evening and early morning. All three species of the *A. punctulatus* group were taken biting outdoors at 2 p.m. at Burui. The more recent collections have revealed the presence of *A. subpictus* Grassi in Wewak.

TABLE XIII.

Microfilaria Rates.

Locality.	Number of Subjects Examined (All Ages).	Positive Findings.
Maprik	317	8.0% (males, 11.0% ± 2.7% females, 4.6% ± 1.6%)
Kunchingini	259	3.5%
Burui	80	1 (adult female)
Wewak (Brandt) ..	92	Nil

such a state essentially with the presence of *P. falciparum*, although they considered that the other species might play a minor role. According to Macdonald's calculations (1950), the maximum inoculation rate with *P. falciparum* necessary to produce 100% parasitemia in infants by about the age of four months is 0.04 (that is one infected bite in twenty-five days or 14.6 per year). Field observations have shown a similar discrepancy between the inoculation rate based on entomological observations and that based on an analysis of infant infections. Davidson and Draper (1953), for example, calculated that on the coast

TABLE XIV.
Collections of Adult Mosquitoes.

Locality.	Time of Day.	Manner of Collection.	Species.							
			<i>A. punctulatus</i> .	<i>A. farauti</i> .	<i>A. koliensis</i> .	<i>A. karwari</i> .	<i>A. subpictus</i> .	<i>A. annulipes</i> .	<i>T. uniformis</i> .	Other Culicines.
Maprik	18.30 to 19.30	2 collectors; 6 men as bait (outside hospital).	5	7	7	—	—	—	—	40
Burui	14.00 to 14.30	2 collectors; about 20 children as bait (outdoors).	3	1	4	—	—	—	19 (Many discarded)	39
	20.00 to 20.30	2 collectors; many children as bait (in dormitory).	23	11	22	1	—	—	(Many discarded)	—
Wewak (Boram).	20.00 to 21.30	2 collectors; 4 men as bait (in house).	2	48	4	—	—	—	—	14
Wewak	Various times (from 11/7/56 to 1/8/56).	2 collectors (in and out-doors).	8	651 females 1 male (plus 103 ? this species damaged in transit).	8	—	38	—	—	157

of Tanganyika this factor was 0.0094 by observations on infants and nearly 1.0 by observations on the vectors. They explained this difference by the assumption that "a high proportion of bites by anophelines with sporozoites in their salivary glands do not result in parasitæmia, the infection being in some way aborted before parasites are found in the peripheral blood".

In holoendemic malaria in Africa (World Health Organization, 1951) and India (Wilson *et alii*, 1950) the spleen rate rises rapidly in young children, with a corresponding rise in the parasite rate, maximal by the age of five years. This is followed by a rapid drop in the parasite density and parasite rate and a more rapid drop in spleen rate as adult life is approached. The parasite densities of adults are very low. Macdonald (1951) commented that further studies of the gametocyte prevalence and infectivity should be made. He stated (of *P. falciparum*, which he considered the main immunizing agent):

When malaria is endemic, but at a low level of transmission, gametocytes remain frequent in all age groups occurring in something like 30% of those showing asexual forms . . . In endemic areas of considerable prevalence of malaria there is a very marked age distribution of crescent prevalence.

The latter condition was recorded by Mackerras and Aberdeen (1946), and the former in the present survey. Mackerras and Aberdeen also recorded a high adult spleen rate in the presence of a low adult parasite rate, a finding quite different from that of the present survey. It is possible that these differences are the result of a lower intensity of transmission inland, where most of the present survey was made, than on the coastal strip.

Swellengrebel (1949) recorded the results of a survey in the western Sentani lakes near Hollandia. He found a spleen rate of 69% in 161 adults with a corresponding parasite rate of only 29%. Similar observations have been recorded by Metselaar (personal communication). The present survey shows a spleen rate of 58.8% (Maprik and Kunchingini combined) and a parasite rate of 52.6% in adults. *P. falciparum* is by no means the main agent in this area, *P. vivax* and *P. malariae* forming an appreciable

proportion of the infections in early years. Parasite densities as shown by the method used here, admittedly crude, nevertheless do not drop so dramatically in older children and adults as they do in a truly holoendemic situation. We have no information here on the frequency of inoculation; but a rough comparison of Table XII with Macdonald's figure (1950) suggests an inoculation rate in the region of 0.01. Metselaar, in the Sentani lakes area (personal communication), has studied the house densities of the local Anopheline vectors in various seasons, and his findings will be published shortly. We have established the presence of at least three good vector species here in apparently adequate numbers to carry on transmission at a high rate. The factors involved in transmission have been expressed mathematically by Macdonald (1950, 1952 a, b, c) and illustrated in the field by Davidson and Draper (1953) and by Davidson (1955), among others. From their observations they have been able to assess the degree of control necessary to reduce transmission below the level at which malaria can maintain itself in the community. Their methods of study and analysis can give a valuable clarification of the endemic situation here, and involve a detailed study along the following lines:

1. From Macdonald (1951): (i) Measurement of gametocyte prevalence (rate and density in all age groups). (ii) Gametocyte infectivity studies (density in relation to infectivity to local vectors). (iii) Sporozoite rates of the local vectors. (iv) Local vector frequencies and seasonal distribution by hand and window-trap captures. (v) The inoculation rate by analysis of infant infections. (vi) A comparison between these and a mathematical analysis of the expected relationships between gametocyte and sporozoite rates.

2. From Macdonald (1952c): (vii) The period of infectivity of the three species of *Plasmodium* in untreated cases. (viii) The frequency with which various vectors feed on man (by window trap catches, precipitin tests of blood meals). (ix) The measurement of the period between egg hatching and first egg laying, and the checking of methods of distinction between parous and nulliparous specimens of all vector species. (x) The direct measure-

TABLE XV.
Larval Collections.

Site.	Salinity. (Percentage of Sea Water.)	<i>A. farauti</i> .	<i>A. punctulatus</i> .	<i>A. koliensis</i> .	<i>A. bancrofti</i> .	Other Species. ¹
Brackish swamp	12.3	46	4	—	—	—
Outlet with brackish water	1.23	51	3	—	—	—
Drain with brackish water	0.5	82	16	—	—	—
Hole in coral pit	Nil	77	1	4	—	—
Hole in coral pit	0.26	47	3	—	—	—
Swamp	0.14	3	—	—	16	1

¹ *Bironella (Brugella) travestita* Brug.

ment of the efficiency of insecticides (by experimental huts). (xi) The indirect measurement of mosquito mortality by assessment of the age constitution of populations in controlled and uncontrolled areas (to ascertain the probability of survival through the extrinsic cycle and the expectation of life of those that do survive; made through the comparison of immediate and delayed sporozoite rates, and cage mortalities—Macdonald, 1952a).

3. To these we would add: (xii) An analysis of hospital statistics. (xiii) Further studies on the morbidity and mortality rates among the indigenes.

Such studies could answer questions such as the following: Is malaria holoendemic in New Guinea? If not, why not? What is the explanation of a high adult spleen rate in the presence of a low parasite rate? What degree of vector control is required to break the transmission cycle? What is the burden that malaria imposes on the community?

This survey has served the purpose of drawing attention to the gaps in our knowledge of this area and the means by which these may be filled. It has also revealed an area suitable for the study of such problems, and has produced evidence contradicting that recorded by earlier workers. A pilot project for malaria control by residual spraying will be set up in the Maprik subdistrict of the Sepik in the near future, and it is hoped that there many of these investigations will be undertaken.

Summary.

A malaria survey was carried out in April, 1956, in the Sepik district of New Guinea. Parasites were examined in thick blood films stained with Giemsa stain.

The spleen rate ranged from 100% in children aged two to four years to 46.5% in adult males. The rate was higher in women, and it is suggested that this was due to generalized viscerosplenitis in *multiparæ* rather than to a difference in the degree of malarial morbidity.

Adult parasite rates were higher in this survey than in previous surveys in New Guinea. The rate ranged from 100% in children aged two to four years to 46.2% in adults. There was no significant difference between the rates for men and women.

School children in two areas showed a significant lowering in the parasite (but possibly not the spleen) rate in comparison with children not at school. This was probably due to their receiving repeated treatment with malaria schizonticides for minor illness.

P. falciparum, *P. vivax* and *P. malariae* were present in all age groups. *P. falciparum* was the dominant species in the youngest children and *P. malariae* in adults.

The gametocyte rate was high in all age groups, for example, in Maprik 11.8% of the adult population were gametocyte carriers. Gametocyte densities were not recorded in detail, but were generally higher in children. The rate rose to 50% of all those aged under two years examined in Maprik. The over-all rate for this community was 18.4% of 305 people examined. With all three species, about one-third of those people found to have parasitæmia had gametocytes in their blood.

The parasite rate of infants aged under one year was up to 83.3%. Very heavy infections with all three species were seen.

Of the blood taken in the daytime in Maprik, 8% contained microfilaria of *W. bancrofti*.

A. punctulatus Dönitz and *A. kollesiensis* Owen were the dominant species of vector inland. *A. farauti* Laveran was very common on the coast and far outnumbered the other species. All three species were taken biting in daytime near the Sepik river and resting in houses.

A. karwari James was recorded for the first time east of the Dutch New Guinea border. This is a potentially dangerous vector whose spread requires to be watched.

The findings here and in earlier surveys are discussed in relation to the definition of endemicity in this area. The problems which should be studied in detail to clarify the position are considered in relation to a mathematical analysis of endemicity and the possibility of future control.

A pilot project will be set up in this area in the near future to study these problems.

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X-RAY THERAPY IN POST-TRAUMATIC ARTHRITIS, PARAARTHROSIS AND FASCIITIS.

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It was within only two years of the discovery of X rays by Röntgen that Gocht, in 1897, reported relief of the pain of trigeminal neuralgia by X-ray irradiation. This report was closely followed by several others which recorded improvement following the radiotherapeutic treatment of fascial and neuritic pain, and in the last fifty years there have been numerous reports of the relief of symptoms in arthritis by means of X-ray therapy. It is difficult to explain why such therapy is practically diagnostic in its ability to relieve the pain and stiffness of ankylosing spondylitis, but nevertheless can achieve very little control of symptoms in rheumatoid arthritis. However, it is well known that in the case of arthritis, similar pathological changes may be associated with different disease entities, and this therefore may be the cause of the widely varying results recorded in the literature following X-ray therapy.

Persisting disability in joint movement following fracture or more minor injury is not uncommon. As in many of these cases the condition follows occupational accidents, they are the subject of litigation, and some of these patients may be considered malingers if the underlying pathology is not recognized. The most important pathological bases to these symptoms are post-traumatic arthritis, post-traumatic paraarthritis, and fasciitis.

Post-Traumatic Arthritis.

Post-traumatic arthritis may arise after a fracture involving the intracapsular or juxtaarticular portion of a bone. Residual pain of a throbbing or aching nature may persist for months after the fracture has united. In order that arthritis should result after trauma, the joint cartilage must have been damaged or the mechanism of the joint upset, and a possible exciting factor is premature use or overuse of an injured and inflamed joint. The resultant joint changes, which are almost identical with those of hypertrophic arthritis, usually appear three to six months after injury, but may appear as early as four weeks or be delayed for years (Doub, 1933). Arthritis may occur in any joint, but is particularly common in the lower limbs following fracture in the vicinity of a joint, because of the weight-bearing stresses to which the articular surfaces of the lower limbs are subjected. The stresses are particularly great if the patient is overweight, the entire body weight being carried on a small joint surface with each step. Hence, even a relatively small irregularity in the joint surface will not be tolerated.

After a Pott's fracture of the ankle, failure of firm union in the tibio-fibular ligament with subluxation of the astragalus in the tibio-fibular joint may lead to arthritis. Similarly malunion in the malleolus of either side may lead to subsequent arthritis, which may even require arthrodesis of the tibio-astragal joint for relief of pain, and fracture of the astragalus may lead to arthritis of its joint surfaces. Fractures of the calcaneus have long been recognized as predisposing factors in the production of long-standing disability, usually owing to changes in the astragalo-calcaneal joint. Typical symptoms of post-traumatic arthritis in the foot include undue persistence of oedema of the part, associated with pain on weight-bearing. Throbbing in the part at rest, or at night, may occasionally be referred up to the knee or even to the hip as a neuralgic pain. Local points of tenderness are common, and pain with specific movements is usually found. In some of these cases disuse atrophy of bone may be seen radiologically, and in others post-traumatic Sudeck's atrophy of the bone may be found.

Included under the heading of post-traumatic arthritis are also some less easily identified conditions. Thus, for example, in the case of the knee joint, intermittent hydrarthrosis of the joint and chondromalacia of the patella may originate after a single injury or after repeated minor traumata. In the series of cases described are also included several of persistent pain and loss of function in joints following operation. Such symptoms not uncommonly follow arthroplasty or meniscectomy.

Treatment.

In the present series, X-ray therapy was usually tried after failure of various physiotherapeutic measures, the administration of "Butazolidin" and of injection of "Novocain". It was often recommended as a last measure before arthrodesis or arthroplasty was carried out, and in my experience it has avoided these operations in many cases.

Ochsner and Mumford (1940) reported the results of X-ray irradiation in 52 cases of post-traumatic pain, some of which were associated with osteoporosis. In their cases there was relief of pain in 13 out of 27 post-fracture cases, in six out of 14 post-traumatic cases without fracture, and in five out of 11 pain in joints following operation or infection. Relief was therefore obtained in approximately 50% of cases in which there was antecedent trauma or operation. Ochsner and Mumford note that relief was obtained in the majority of cases during treatment, but was occasionally postponed until several weeks later. The

X-ray dosage in their cases was quite low—100r repeated for about four treatments at intervals of two to three days. To quote these authors: "In a number of cases almost miraculous results occurred. Patients walked who for some time had been unable to, or regained the use of hands and arms which were thought to be hopelessly crippled."

Table I lists examples of post-traumatic arthritis involving the joints of the foot, ankle, knee and hip, referred for X-ray therapy. Cases of spinal arthritis following injury were excluded because of the contentious nature of the subject and the difficulty in demonstrating objective signs of improvement. In three of the cases persistent pain and disability followed operation, such as arthroplasty on the hip joint, or meniscectomy on the knee joint. In six of the 13 cases the symptoms had been present for a period varying from nine to twenty-four months. After treatment, in seven of the 13 cases there resulted considerable relief of symptoms within one to four weeks, and the part was returned to nearly normal activity after that period. However, treatment was repeated three to six months later if any disability recurred. In four of the six remaining cases improvement resulted after two to three months, and a further course of therapy was required at a later date. In only two cases, both of arthritis of the hip and "failed arthroplasty", did treatment not produce any long-term benefit.

Thus, in about 50% of cases the periarticular swelling and pain on weight-bearing and movement were relieved rapidly by a single course of X-ray therapy, such relief being obtained even in cases in which symptoms dated back nine to twenty-four months. In some of the cases temporary increase of pain was noted in the first week of treatment, but this generally foreshadowed an excellent response a week or two later. For this reason treatment was prolonged to three weeks in the majority of cases, a dose of 900r to 1000r being given uniformly throughout the affected joint.

Post-Traumatic Paraarthritis.

Fracture, surgical intervention, bone infection or repeated minor strain and injury may lead to tendinitis or fasciitis around a joint. This may or may not be associated with paraarticular calcification. Typical symptoms are chronic dull pain and stiffness, which flare up into acuteness after sudden exertion or injury. The diagnostic feature in these cases is the increase in the acute pain by movement of a specific muscle or group of muscles; but reflex "spread" of the pain is not uncommon. The calcification is usually homogeneous in character in the acute phase, but often granular in the chronic or resolving phase.

The condition is seen most commonly in the shoulder region in the bicipital or supraspinatus tendon (Codman's tendinitis). Similar well-recognized entities are seen in the adductor muscles on the medial aspect of the knee, overlying the adductor tubercle (Pellegrini Stieda lesion), and over the lateral aspect of the elbow joint in the supinator attachment (epicondylitis). Less easily recognized lesions are seen around the hip joint in the pyriformis, gluteal or obturator muscles, and around the flexor tendons of the wrists, ankles, hands and feet.

Treatment.

Immobilization of the part often leads to slow improvement in a proportion of cases, and the use of diathermy or "Novocain" infiltration will often give relief. The use of X-ray therapy is often restricted to those cases in which such measures fail, but is followed by relief of symptoms within several days in 95% of cases, provided that treatment is started in the acute phase. The longer treatment is delayed after onset of the acute attack, the longer is the response delayed. Nevertheless, pain which has been present for a year or more will often decrease in intensity within one or two weeks of the institution of treatment, although residual stiffness usually takes longer to eradicate. Symptoms recur at a later date in about one-third of cases of paraarthritis, as the degenerative changes are not reversible. Nevertheless, calcification is usually resorbed within three to twelve months of therapy.

TABLE I.
Post-Traumatic Arthritis.

Sex.	Age. (Years.)	Diagnosis.	Duration of Symptoms. (Months.)	Radiographic Changes.	Clinical Condition.	Dosage of Radiation Given (Tissue-dose).	Time Before Relief.
F.	48	Post-traumatic osteo- chondritis of the right patella.	3	None visible.	Periarticular swelling and pain.	900r in 18 days.	One month, consider- able relief.
M.	66	Right Pott's fracture.	9	Subluxation and arth- ritis.	Periarticular swelling and pain.	900r in 11 days.	One month, consider- able relief.
M.	48	Left Pott's fracture and subsequent arth- rodosis.	9	Talo-calcaneal arthritis.	Periarticular swelling and pain.	1000r in 19 days.	Three months, slow im- provement.
M.	52	Right Pott's fracture.	3	None visible.	Periarticular swelling and pain.	900r in 23 days.	One week, considerable relief.
M.	33	Right tibia and Pott's fracture; left meta- tarsal fracture.	2	Subluxation and arth- ritis.	Periarticular swelling and pain.	Left foot, 1000r in 10 days; right foot, 600r in 11 days. 900r in 22 days.	One month, consider- able relief in right foot.
M.	49	Right calcaneal frac- ture.	4	Talo-calcaneal arthritis.	Painful weight-bearing and throbbing.	900r in 18 days.	Two months, slow im- provement.
F.	42	Right Pott's fracture.	2	None visible.	Painful weight-bearing and throbbing.	900r in 18 days.	Two months, slow im- provement.
M.	51	Right hip injury.	21	None visible.	Pain and disability.	900r in 18 days.	One week, considerable relief.
M.	46	Right acetabulum fracture.	24	Arthritis of the hip.	Pain and disability.	1020r in 18 days.	Three weeks, consider- able relief.
M.	69	Right hip arthroplasty (failed).	12	Failed arthroplasty; soft-tissue calcifica- tion.	Pain and disability.	900r in 14 days.	No relief.
M.	66	Right hip arthroplasty (failed).	9	Failed arthroplasty.	Pain and disability.	1350r in 17 days.	Temporary relief only.
M.	67	Right knee sprain.	2	Arthritis of the knee.	Pain, stiffness and effusion.	900r in 20 days.	Two months, consider- able relief.
M.	32	Following menisc- ectomy, right knee.	2	None visible.	Pain, stiffness and effusion.	600r in 10 days.	One month, consider- able relief; pain, but effusion persisted.

Most authorities agree in giving quite small doses of X rays, such as 100r daily or on alternate days for four to six treatments in the acute phase, or for six to nine treatments in the chronic cases. It is of interest that de Lorimier (1937), in reporting his results in such cases, advises much higher doses—400r daily (in air) to a total of 2400r in a week. Such high dosage would appear to be unnecessary.

Examples of post-traumatic paraarthritis are recorded in Table II. From Table II it is seen that, although in over half the cases symptoms had been present for four months or more, yet in all cases pain was relieved within four weeks at the most, and in some within a few days. This is the most satisfactory group for irradiation treatment.

Review of 28 Cases of Paraarthritis at the Shoulder.

The cases of paraarthritis at the shoulder were of two types—the acute post-traumatic type, presenting with a picture of acute inflammation of tendon, bursa and capsule, and the more chronic type with "freezing" of the capsule at the shoulder joint. The age group involved was between thirty and fifty years in the majority of the cases, the proportion of females to males being 17 to 11. The duration of symptoms was less than three months in only seven

out of 28 cases, and in the rest was prolonged even up to ten years. In the latter group, limitation of movement was a more prominent symptom than pain. Calcification was seen in the radiographs in 18 out of 28 cases. Relief of pain from therapy was noted within a week in the majority, but stiffness took longer to relieve. There was failure of relief of pain in only three out of 28 cases, and this was not related to duration of symptoms. Out of 21 patients with a history of symptoms for over three months, 19 were relieved. Further treatment was subsequently necessary in eight of the 28 cases at periods varying from two to fourteen months.

It is seen in these, and in the preceding eight cases of paraarthritis at other sites, that relief of symptoms is noted within one to two weeks of the start of therapy in the majority of cases. Such relief is earlier than that seen in the cases of post-traumatic arthritis. It should be stressed that the majority of patients treated had previously received diathermy, "Butazolidin" or "Novocain" injections, without benefit, and the rapid relief by X-ray therapy is all the more remarkable.

Post-Traumatic Fasciitis.

There are many cases of post-traumatic pain which may not be related to the vicinity of a joint or associated with

TABLE II.
Post-Traumatic Paraarthritis.

Sex.	Age. (Years.)	Diagnosis.	Duration of Symptoms. (Months.)	Radiographic Changes.	Clinical Condition.	Dosage of Radiation Given (Tissue-dose).	Time Before Relief.
F.	45	Epicondylitis, left elbow.	6	Calcification at lateral epicondyle.	Pain after exercise.	900r in 18 days.	One month, pain re- lieved.
M.	40	Epicondylitis, left elbow.	1	None visible.	Pain after exercise.	900r in 18 days.	Three days, pain re- lieved.
M.	47	Epicondylitis, both elbows.	2	None visible.	Pain after exercise and on supination.	900r in 18 days, both elbows.	One month, pain re- lieved.
M.	45	Epicondylitis, right elbow.	4	None visible.	Pain after exercise and on supination.	900r in 15 days.	Two weeks, pain re- lieved.
F.	25	Pellegrini Stieda lesion, right knee.	4	Calcification at medial condyle.	Pain after exercise, and swelling.	900r in 17 days.	Two weeks, pain re- lieved.
M.	19	Pellegrini Stieda lesion, right knee.	2	Calcification at medial condyle.	Pain, stiffness and swelling.	600r in 6 days.	One week, pain re- lieved.
M.	53	Sprain, right ankle.	2	Calcification at medial malleolus.	Pain with weight- bearing.	900r in 11 days.	One week, pain re- lieved.
F.	16	Sprain, right wrist.	15	None visible.	Aching and weakness.	600r in 14 days.	One month, pain re- lieved.

soft-tissue calcification, and which are therefore less easily recognized. As a result of trauma to the soft tissues which is followed by temporary immobilisation, abnormal reflex patterns may become established. Pain stimuli originate at the site of trauma from a localised fascial inflammatory reaction, and may lead to reflex muscle spasm and loss of joint function. This will lead to further pain stimuli, and continue the vicious circle. There is no doubt that this condition accounts for a proportion of long-term disability in compensation cases in which the patients are suspected of being malingerers.

A well-known and chronic example of post-traumatic fasciitis is the condition known as "painful heel". Periosteal spurs on the plantar surface of the calcaneus are not uncommonly seen in young adults, and it is well established that in some of the cases the condition may be associated with the presence of ankylosing spondylitis. However, in the majority it probably arises as a result of chronic trauma to the plantar muscle and fascia inserted into the anterior edge of the calcaneal tubercle. The condition of "painful heel" with no radiological changes, but tenderness at this point, is presumably the precursor stage of the bony spur.

Treatment.

The use of injections of "Novocain" or "Hydrocortone" and support to the part may lead to relief of symptoms in some cases. X-ray therapy has been found efficacious in relieving the symptoms rapidly.

As is seen in Table III, pain is relieved in most cases of post-traumatic fasciitis within one to five weeks of the start of X-ray therapy. The dosage levels (tissue-dose) are: 100r repeated three times weekly from six to nine doses. Out of 13 cases, pain was relieved in all except three, in two of which it followed excision of the costo-transverse joint. Treatment was repeated three to six months later if disability recurred.

Mode of Action of Radiotherapy in the Treatment of Arthritis, Fasciitis or Paraarthritis.

That the pathological basis for the development of post-traumatic arthritis is a persisting hyperemia of the synovium, capsule or juxtaochondral bone was first suggested by Leriche (1928), and confirmed by recent authors. Leriche observed relief in cases of post-traumatic arthritis by the operation of sympathectomy.

The inflammatory change occurring in tissue after injury is associated with an increased permeability of the smaller vessels, and consequent oedema of the tissues.

Lewis suggested that it resulted from the release of a histamine-like substance from injured tissue. On the other hand, the local production of peptides has been suggested by Menkin as leading to inflammatory change; but it is possible that they act indirectly by the local liberation of histamine. More recently Miles has suggested a serum globulin factor as being more potent than histamine in increasing capillary permeability.

The pain of arthritis is thought to originate largely in the capsule, and much less so in the synovial membrane of the joint (Kellgren and Samuel, 1950). The mode of action of irradiation in these cases would appear to be a local one, and has in the past been considered as anti-inflammatory in nature. Thus, it is well known that the effect of X rays on tissue includes the destruction of leucocytes and rapidly growing cells, increased permeability of the cell membrane, physico-chemical inhibition of cell enzymes, and increase of vascular and lymphatic exudation. (The resultant increase in blood and lymph flow to the part may be responsible for the temporary increase in symptoms which is sometimes observed.) Horwitz and Dillman (1944) report on the successful X-ray treatment of recurrent hydrarthrosis of the knee joint in nine cases. The dose level was approximately 250r tissue dose per week for six or seven weeks. Microscopic examination of a synovial biopsy specimen at the end of this time revealed the disappearance of oedema, increase of fibrous tissue, diminution in the cellular reaction, and a later tendency to *endarteritis obliterans*. These authors note that in normal tissues much higher dosage (2000r to 6000r in four weeks) led to no immediate histological changes in the synovium, capsule or subchondral bone in the joints of irradiated dogs.

It is of interest to note that the injection of "Hydrocortone" into an inflamed joint reduces the joint fluid and decreases the granulocyte and total cell content (Stevenson *et al*, 1952). This action is very similar to that of X-ray therapy. Preliminary exacerbation of symptoms for one to three days, similar to that seen occasionally after X-ray therapy, is seen occasionally after injection of "Hydrocortone" (Hollander, 1953). Cyriax and Troisier (1953) report that the best results from "Hydrocortone" injection are obtained in cases of tendinitis, epicondylitis and infective arthritis. Hollander (1953) reports good results in traumatic conditions; but poor results are generally noted in post-operative arthritis and osteoarthritis of the hip. These selective results are remarkably similar to those obtained both in this series and in others by the use of X-ray therapy.

TABLE III
Post-Traumatic Fasciitis.

Sex.	Age. (Years.)	Diagnosis.	Duration of Symptoms.	Radiographic Changes.	Clinical Condition.	Dosage of Radiation Given (Tissue-dose).	Time Before Relief.
M.	66	Painful heel (left).	3 months.	Left calcaneal spur.	Pain and tenderness.	900r in 16 days.	Two weeks, pain relieved.
M.	51	Painful heel (left).	1 year.	Both calcaneal spurs.	Pain and tenderness.	900r in 15 days.	Two months, pain relieved.
F.	73	Painful heel (left).	7 months.	Left calcaneal spur.	Pain and tenderness.	900r in 17 days.	One month, pain relieved, but returned.
F.	70	Painful heel (left).	3 months.	Left calcaneal spur.	Pain and tenderness.	600r in 11 days.	Five weeks, pain relieved.
M.	36	Crush injury, left thigh.	3 months.	None visible.	Pain, stiffness and tenderness.	900r in 11 days.	One week, pain relieved.
M.	34	Crush injury, left shoulder.	4 months.	None visible.	Pain, stiffness, swelling.	900r in 11 days.	One month, pain relieved.
F.	57	Intercapular fasciitis, following strain.	7 months.	None visible.	Pain and tenderness.	600r in 11 days.	Relief for six months only.
M.	55	Gluteal fasciitis, following strain.	6 weeks.	None visible.	Pain and tenderness.	600r in 14 days.	One week, pain relieved.
M.	34	Fasciitis, right thigh—post-inflammatory.	9 months.	Periosteal reaction in femur.	Pain, swelling, redness.	800r in 11 days.	One month, symptoms relieved.
F.	44	Fasciitis, right pectoralis—post-mastectomy.	4 months.	None visible.	Pain and tenderness.	900r in 19 days.	Relief for six weeks only.
M.	40	Fasciitis following fracture of seventh cervical vertebra.	6 months.	Non-union; spinal fracture.	Pain on movement.	900r in 18 days.	No relief.
M.	31	Fasciitis following excision of costo-transverse joint.	4 months.	No abnormality visible.	Pain and tenderness.	900r in 18 days.	No relief.
M.	58	Fasciitis following excision of costo-transverse joint.	2 years.	No abnormality visible.	Pain and tenderness.	900r in 18 days.	No relief.

In view of the similar clinical and histological reaction of the inflamed joint to both X rays and cortisone, it is possible that both forms of therapy by their anti-inflammatory properties exert a similar end effect in arthritis.

In the case of ankylosing spondylitis, it has been suggested that X-ray therapy may in addition stimulate the secretion of adrenocortical hormone (Stoll, 1957). Thus, it has been shown experimentally (Engelstad and Torgensen, 1937; Leblond and Segal, 1942) that irradiation of any part of the body causes depletion in sudanophil substance in the adrenal cortex, and whole body irradiation causes reduction of the ascorbic acid and cholesterol content of the adrenal cortex (North and Nims, 1949). Seelye (1946) suggested that a wide variety of stimuli, including X irradiation, could induce increased secretion of the adrenal cortex. This thesis is difficult to prove, mainly because assessment of adrenocortical function is still unsatisfactory and the proportion of its constituent hormones difficult to assess. Both plasma steroid and urinary steroid levels have been found raised after surgical operation; but it has been reported that whole-body irradiation, even at levels causing radiation sickness, leads to no demonstrable change in plasma steroid levels. However, the plasma steroid level also depends on its rate of removal by organs such as the liver, and it is well known that the function of this organ is affected by X-ray therapy. That increased adrenal steroid secretion may lead to decrease in capillary permeability has been suggested by Robson and Duthie (1952), and it may also lead to a damping down of cell proliferation and a fibrinolytic action. By all these means the tissue reaction to injury may be decreased.

Under certain circumstances, therefore, X irradiation may lead to increased secretion of endogenous adrenal steroids, with associated anti-inflammatory effects.

Kaplan (1945) suggested that relief of inflammatory pain might result from a direct action of X rays upon nerve endings, possibly relieving pressure on nerve fibres by decreasing the leucocytic infiltration. It is also possible that in other conditions irradiation can temporarily suppress the conductivity of nerve endings, and this theory may explain the observed relief of pain following X-ray therapy in such diverse conditions as syringomyelia, neuritis, Paget's disease of bone, fibrositis and degenerative joint and cartilage conditions. With regard to the direct effect of X rays on nerve tissue, Langer (1933) reported that relief of symptoms from osteoarthritis could be obtained by irradiation of the spinal ganglia. He suggested that irradiation might affect the vegetative nervous system, causing an improved blood supply. In many cases in which loss of function and pain follow joint injury, these symptoms are ascribed to changes in the joint capsule, the joint surface, or the tendons and ligaments around. However, it is likely that such loss of function is due to muscle spasm arising reflexly from pain impulses in a traumatized area. As a result of muscle spasm, immobilization and disuse of the part, abnormal reflex patterns become established. X-ray therapy, possibly by decreasing nerve conductivity can break the reflex arc, and similar results may be achieved in these cases by the use of muscle relaxants of the "Myanesin" group.

A possible third method of pain relief from the use of X-ray therapy is therefore by a direct effect on nerve conductivity. Despite all theories, the almost complete inability of irradiation to control the symptoms of diseases such as rheumatoid arthritis must be freely admitted.

Prognostic Factors.

The following factors influence the response to X-ray therapy in post-traumatic arthritis and paraarthritis, although it is difficult to prognosticate the degree of relief to be expected in any individual case. A beneficial effect, from irradiation seems to depend on the presence of an infective element, or associated tendinitis, fibrositis or paraarthritis, as noted by Kahlmeter (1933) in an analysis of 5000 cases of various types of arthritis. Poor results are noted in post-operative arthritis.

Duration of Condition.

Pain is relieved rapidly in patients coming to treatment early. However, full range of movement takes longer to recover, sometimes several months, particularly in chronic cases. When adhesions are present, exercises and manipulations may be necessary to recover mobility.

Site of Lesion.

Non-weight-bearing joints such as the shoulder and arm show a more satisfactory response to irradiation than those of the spine and lower limbs.

Reaction After Treatment.

There may be a temporary increase in pain after the first treatment in acute cases, or after the first week in chronic cases. This may be due to the temporary increase in tissue oedema, and often prognosticates a good response later. Such a reaction is more likely to be manifested in chronic cases than in acute cases.

The Presence of Periarticular Calcification.

The presence or absence of a calcified area adjacent to the joint does not in general influence the response to irradiation, and while some authorities hold that it leads to a greater likelihood of remission of symptoms, others suggest a lesser likelihood. In view of the fact that it is merely a visible manifestation of a more extensive process, one would not expect it to affect the issue. Calcification is usually resorbed within three to twelve months of X-ray therapy, possibly as a result of the hyperemia induced.

The Presence of Intraarticular Joint Destruction and Osteophytes.

The presence of bone and cartilage erosion does not affect the results of X-ray therapy, neither is relief of pain from X-ray therapy associated with changes in the radiological picture of joint destruction. This is understandable, as the site of pain is the joint capsule and synovium.

Summary.

The result of X-ray therapy in the relief of post-traumatic pain is assessed in 62 patients. Relief of pain develops in one to four weeks in about 50% of cases of post-traumatic arthritis, but more rapidly and in a much higher proportion in cases of post-traumatic paraarthritis and fasciitis. An attempt is made to explain the action of X-ray therapy in these cases, and the results are compared with those of local injection of "Hydrocortone".

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ALLERGY IN CHILDHOOD:

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BEFORE commencing my paper I wish to explain that this will not be a high-powered medical thesis, but the gathering together of my observations on the allergies I have seen in children. I am glad to have the opportunity of bringing this subject to your notice. It is very important, because if children with allergies can be well managed from their earliest years, many of them will be saved much chronic ill health in later life.

In my experience it is rare to see a child showing the manifestations of allergy without a family history of one or other parent, grandparent, aunt, uncle or other relative also suffering from some allergic condition. However, occasionally one does see a child whose parents are most emphatic, even after the closest questioning, in stating that there is no allergy at all in their family. I have noticed that most babies who have eczema have a fairly constant background of allergy; the same applies to most, but not all, the children with hay-fever and asthma. In contradistinction, many children who suffer from hives have a less definite or no family history of allergic states.

The main allergies of childhood which I will consider are as follows: infantile and flexural eczema; urticaria and other skin reactions; seasonal hay-fever and vasomotor rhinitis; asthma. Occurring less frequently, but still worthy of consideration are gastro-intestinal allergy (food hypersensitivity), migraine or cephalic allergy, and enuresis.

Infantile Eczema.

Infantile eczema does not usually appear until some months after birth. We find that dermatologists share with the allergists the worry of looking after these children, or else the allergists never see these children at all, as the dermatologists keep them. However, we are all familiar with the difficulties of treating infantile eczema and with the problems of finding the correct feedings for these babies. Babies should be breast fed as a routine procedure, unless definite and strong contraindications are present. Some authorities consider that babies with infantile eczema should not be breast fed, as allergens may be passed on to the baby through the breast milk. I

believe that breast feeding should be persevered with whenever possible, even in the presence of infantile eczema and a strong family history of allergy; however, if the infantile eczema in a breast-fed baby is uncontrollable, it is wise to try some other milk. We have all seen dramatic cases of infantile eczema in which the condition clears after the milk feeding has been changed, for example, to goat's milk or to the less allergenic milks—those in which the protein has been denatured ("Nestlé's Ideal Milk" for example). We have also seen the patients who do not respond to any dietary changes or treatment whatsoever. At present I am still occasionally examining a boy, aged fourteen years, who was three years of age before his infantile eczema cleared, and who still has frequent bouts of flexural eczema. Many children who suffered from infantile eczema as babies develop flexural eczema in the older years of childhood. These conditions are frequently resistant to treatment, but applications of hydrocortisone have given great relief in some cases. Fortunately, infantile eczema usually clears up by the time the child reaches the age of two or three years; but unfortunately many babies who suffered from infantile eczema develop hay-fever and asthma in later life.

Hives or Urticaria.

How my heart sinks when I look at a young child covered in the red, irritable spots of hives or urticaria. Usually neither the mother nor the child knows what has caused them; nor do I.

I have seen hundreds of children with hives in clinic work and private practice. In these cases I have taken a very careful history and discussed the diet in detail with the mother; yet it is rare that one can pick out a new article of food first introduced just prior to this crop of hives. Ingested foods are frequently suspected of being the allergen responsible for the production of hives, and after careful consideration of the diet it is sometimes possible to eliminate an article, such as tomatoes, a new cereal, strawberries, oranges or fish, and the hives clear and do not recur unless this food is reintroduced. However, this is rare in my experience, as usually withdrawal of a food makes no difference to the appearance of the hives.

Urticaria may be found as a response to stimuli other than foods—for example, it may result from the bites of insects such as fleas or mosquitoes. A few years ago there was in Melbourne a plague of fleas whose bites were causing allergic urticarial responses in susceptible children and adults. We saw a number of these reactions, with the urticarial spots appearing all over the body interspersed with the bites, and some of the bites had tiny central blisters. Urticarial reactions may also follow the injection of such allergenic solutions as animal sera (tetanus and diphtheria antitoxin, T.A.B. vaccine), drugs such as morphine, sulphonamides, penicillin *et cetera*, or overdoses of allergenic extracts and also occasionally injections of liver, insulin *et cetera*.

It is, in general, so difficult to isolate an allergen responsible for producing urticarial reactions that one must consider further how these reactions may occur. It is possible that in urticaria, as in some other allergies, there is a trigger action of some hitherto innocuous substance firing the gun in a system already charged for an allergic response, and in this case hives develop as a result not of the one stimulus, but of cumulative stimuli. In some cases hives are probably not allergic at all. In my experience—and, I gather, in the experience of other workers—a great many patients with urticaria do not show manifestations of a true allergic response. There is frequently no family history of allergy, nor do any other allergic conditions appear at any time of the life of these patients. Therefore, it is my opinion that many of these cases of urticaria are not of allergic origin, but have some other causative factor.

Angioneurotic Edema and Contact Dermatitis.

Angioneurotic edema and contact dermatitis are allergic conditions that may occur in children. They are treated in the same way in children as in adults.

¹ Read at the annual meeting of the Section for the Study of Allergic Diseases of the Victorian Branch of the British Medical Association on November 3, 1955.

One little boy whom I examined had climbed through the fence to play cubby-houses in the long pollinating grass, and came out with an allergic rash over both legs and the backs of his hands—that is, the exposed parts.

Hay-Fever.

In my experience one sees few cases of hay-fever in the first years of childhood, but an increasing number of cases in the older years of childhood. In the younger children this type of allergy frequently shows up as a wet nose. The mother often consults the doctor for no other reason than that Johnny's nose is always running, and she thinks he has catarrh, like someone else in the family. On close questioning one frequently finds that the running nose is worse sometimes, and not so bad at other times, and also that it may be associated periodically with a blocked nose. The nasal discharge may be watery or mucopurulent or purulent. On first examination of the nose, usually a pale, soggy, oedematous mucous membrane and a watery discharge are found. In other cases the mucous membrane is frequently red and injected, which indicates the presence of infection with a purulent or mucopurulent discharge. In these children there may also be evidence of enlarged and infected tonsils and adenoids.

These wet noses in young children may develop into hay-fever in later life, so the children should be managed and treated as early as possible. A careful history should always be taken, and skin tests may help to elucidate the problem. The allergy should be controlled as adequately as possible, and next any infection present should be cured. The importance of giving the child an adequate airway must be borne in mind in these cases. Avoidance of allergens and the use of "Neo-Synephrine-Thenfadil" nasal drops and antihistaminics helps. If necessary, infected tonsils and adenoids should be removed and antral washes carried out when indicated.

The older children suffering from classical hay-fever or vasomotor rhinitis need investigation and treatment and usually desensitization along the same lines as do adults. In most of these cases of hay-fever in children there is a family history of allergy.

Asthma.

In my experience, asthma is unfortunately seen more commonly in childhood than any other allergic manifestation. Children suffering from asthma frequently have a strong family history of allergy. The age of onset of the attacks is very often from the first to the fourth year; however, the first attack may occur at any age. Asthmatic attacks in children vary greatly from a mild wheeze and slight difficulty with breathing, noticeable mainly on expiration, to a fully developed bout of *status asthmaticus*.

The first factor with bronchial asthma at any age is to diagnose it correctly; the next is to provide adequate allergic management of the patient both between and during attacks. In the diagnosis of asthma, there is little chance of mistaking the characteristic attack of *status asthmaticus* of bronchial asthma unless it is confused with cardiac asthma; fortunately the latter is very rare in children. In the less severe though still serious attacks of asthma the diagnosis may be more difficult, so-called croup and recurrent bronchitis being the most frequent problems in differential diagnosis, though the rarities such as tumours or congenital abnormalities must be considered. The differential diagnosis between recurrent bronchitis and recurrent asthmatic attacks is sometimes difficult if one is examining a patient for the first time. It may be helped by considering the following points. If there is a history of a respiratory infection for a few days previously, such as a cold, cough or a sore throat, particularly if this was accompanied by fever before the wheeze and shortness of breath commenced, the diagnosis is in favour of bronchitis. In contradistinction, in the asthmatic attacks the cough, wheeze and shortness of breath appear in a child who, though subject to asthma, is apparently well at the time, and not obviously sickening for some other disease. An injection of adrenaline hydrochloride (1:1000) will serve if necessary as a therapeutic test, as it invariably

gives dramatic relief to the child suffering from asthma, but makes little difference to the child with bronchitis. Further, an attack of bronchitis is usually of longer duration than an attack of asthma. Children with recurrent bronchitis and an allergic history must be regarded as suffering from allergic bronchitis, and are therefore potential asthmatics. These children should be investigated thoroughly along allergic lines and then treated according to the findings. If this treatment is carried out adequately, they may be saved much chronic ill health in later life. It is important to know whether one is dealing with a child with either asthma or asthmatic bronchitis on the one hand, or recurrent bronchitis on the other, as the management and treatment of these conditions are different. For example, in the latter (bronchitis), antibiotics are important in the therapy and of less value in asthma. It must be remembered that the only occasions on which some children develop asthma are when they have a cold or other respiratory infection. These children are probably sensitive to their own organisms or to the products of these organisms, and are therefore allergic.

The Treatment of Asthma, Asthmatic Bronchitis and Recurrent Bronchitis.

Let us now consider some points in the management and treatment of children with asthma, asthmatic bronchitis or recurrent bronchitis. These children should be kept away as much as possible from sources of respiratory infection—that is, from people with coughs, colds or sore throats—and they should also avoid crowds, particularly in indoor places. In my opinion, when practicable, whenever these children get a fresh infection they should be put to bed, in an attempt to prevent a severe attack of bronchitis or asthma from developing. Care should be taken also that these children avoid chills, particularly when they are away from home in thin clothes and the weather changes; they should therefore be encouraged always to have a woollen jacket or sweater with them, and to put it on as soon as there is a drop in the temperature or a cool wind springs up in our very changeable climate. If the child cannot be relied on to do this, he should be made to wear a thin woollen singlet. Over-heating from strenuous sport is best avoided. If such a child does play sport and grow hot, a jacket should be put on immediately he stops playing. Certain atmospheric conditions also irritate these children, and therefore should be avoided as much as possible, particularly cold winds and fog and a dust-laden or pollen-laden atmosphere. Attention to all these factors should help to prevent some attacks of asthma or bronchitis.

Breathing exercises are of great value both to children with recurrent bronchitis and to those who suffer from asthma or asthmatic bronchitis; for preference, these exercises should be given under the instruction of a trained physiotherapist. One of the unfortunate results to a child of being a chronic asthmatic is the failure to develop a normally functioning chest. In severe cases there may be a pronounced degree of chest deformity—the child may develop a barrel-shaped and fixed chest or kyphosis and pronounced anterior caving in of the lower ribs. I have watched a number of these children over the years and have been delighted by the great benefit many of them have derived from these chest exercises; some have developed better functioning chests than their normal brothers and sisters. Good chest movements enable adequate exchange of respiratory gases to take place and favour the expectoration of mucus. This mucus is frequently sticky and so collects in the bronchial tree, causing small blockages, which predispose the child to the development of an attack of bronchitis or asthma. If this sputum can be got rid of by the child, the number of attacks of asthma or bronchitis will be lessened. This week I examined an asthmatic child whom I have been watching for some time, and the mother said to me quite spontaneously: "Since Judy has been doing her exercises and has learnt to bring up the mucus from her chest she has definitely had fewer attacks of asthma."

In addition to the measures already outlined for both bronchitic and allergic children, the child with chronic asthma also needs careful anti-allergic management. This includes, firstly, the taking of a careful history and attention to the details which emerge from this, and then a follow-up with a search for the offending allergens; these allergens must as far as possible be avoided by the child. Close attention should be paid to the child's diet in this survey, as some food to which the child is sensitive may be the exciting cause of the asthma. Sometimes this is found from the history, or by elimination diets or by skin-testing. Skin-testing is of debatable value in young children, for several reasons; it is a major and frequently unpleasant experience for the child, and also the results may not be accurate, as children often have a changing pattern of allergy.

However, I well remember a girl, aged fifteen months, very severely asthmatic from her earliest months, with a strong family history of allergy. Her grandmother was treated in *status asthmaticus* by many present in this room. The child at fifteen months was skin-tested, and reacted strongly to potatoes. These were eliminated from her diet, with a dramatic lessening in the number of attacks of asthma.

Egg white is a strongly allergenic food and is sometimes found to be the cause of asthmatic attacks in children. In children ingested foods are more commonly a cause of asthma than in adults.

A child should be given an adequate, well-balanced diet (with the omission of any foods found to precipitate attacks in allergic children), and added vitamins should be given. Supplementary glucose frequently helps at the fatigue points of the day, particularly the older children who come home from school tired. Asthmatic children do best with three adequate meals a day, rather than with a light breakfast and lunch and a heavy dinner at night. If these children have achlorhydria it should be corrected, and also the bowels should be kept well open.

On principle, all allergic children are best to have allergen-free bedding, and bedrooms well ventilated and free from dust; these children should also be kept away from house dust as far as possible. It may also be necessary to eliminate household pets and furry toys. All children must have adequate rest. This is particularly important for asthmatic children, as over-fatigue can be a precipitating factor in an attack of asthma. Excitement can also help to cause attacks of asthma. I have noticed that anticipation of some exciting event, such as a longed-for birthday or an outing, will frequently be a factor in causing the child to have an attack of asthma on the big day. Nervous tension, such as waiting for an examination, or the strain of not getting on very well with the teacher at school, is also a factor in influencing the frequency of attacks; likewise any special strain in the child's home environment is detrimental. All these situations should be avoided as far as possible. When it is desired to give the asthmatic child a treat, this is often better given without too much build-up beforehand; also tension and worry should be eliminated. An atmosphere of calmness at home is most important and a great help to the child, both in preventing attacks and at the times when they occur.

There is one family I look after in which mother seems to enjoy having "nerves" and also never stops talking, father suffers from a war neurosis and screams at the family, and two of the children are chronic asthma sufferers. When they come to see me I am completely exhausted after half an hour, and the thing I do not know is why, instead of two of the children only having asthma some of the time, they do not all have asthma all of the time.

A further important factor in the management of asthmatic children is that they must not learn to use their asthma to get their own way, or to retire into sickness when life becomes difficult for them. Many children who suffer from asthma are of above-average intelligence, and it is very easy for them to learn to use their asthma for their own ends. I can recall several children who have admitted this to me.

One in particular, who has severe house-dust and pollen sensitivity, now sufficiently well controlled for her to be a

trainee nurse at one of the public hospitals, told me how, when she was a child, she was always able to turn on an attack of asthma if she did not want to go to school or if she felt that some other member of the family was getting too much attention.

No discussion dealing with asthma in children is complete without some reference to the vexed question of the removal of tonsils and adenoids. In my opinion, each case must be considered on its merits. An allergic child has a predisposition towards hypersensitivity reactions; but this same child meets pathogenic bacteria in the same random fashion as does any other child, and so may develop infection in his tonsils and adenoids. This infection is superadded to the allergic diathesis already present; both conditions are likely to produce swollen mucous membranes with blocked nasal and lower respiratory passages, so both the allergy and the infection need treatment. If, despite treatment of both allergy and infection, the child still has blocked nasal passages and an adenoidal facies, recurrent *otitis media* or infected tonsils, in my opinion removal of the tonsils and adenoids should be carried out and the child given a better nasal airway and the focus of infection removed. A good airway is essential for the growth and development and well-being of the child. I have seen many asthmatic children derive great benefit to their general health and considerable relief from their asthma from the removal of infected tonsils and adenoids. Some authorities consider that tonsils and adenoids should never be removed from asthmatic children, for they contend that the asthma will become worse. From my experience I cannot agree with this sweeping assertion, though I must admit that it holds in some cases. However, as I have already said, certain selected asthmatic children do derive great benefit from the removal of tonsils and adenoids.

There are a number of important facts in the management of asthma in children which I feel must be mentioned in this paper, such as the following:

Children can tolerate much larger doses of adrenaline hydrochloride (1:1000) than many general practitioners like to give.

Oxygen given early in *status asthmaticus* and whenever the child's breathing is very laboured is of the utmost importance.

Aminophyllin may give relief from their attacks of asthma. It is best used rectally or intravenously, as it is very painful if given by intramuscular injection.

Sedation (not with any morphine derivative) will help in controlling an attack; a mixture of chloral hydrate and potassium bromide is useful, as also are the barbiturate drugs.

There is a place for ACTH and cortisone in intractable asthma in children.

"Neopine" or "Isuprel" (noradrenaline derivative) may also help.

Antibiotics are a help in asthmatic attacks only in so far as they help to control any associated infection.

Ephedrine, or ephedrobarbitone, is of value in mild attacks of asthma. Continuous antispasmodic therapy will help to prevent attacks.

Gastro-Intestinal Allergy.

Gastro-intestinal allergy occurs in children, though it is often very difficult to be sure of the diagnosis here. Gastro-intestinal allergy may occur as either a very mild or a dramatically severe reaction—Henoch's purpura exemplifies this latter. I remember seeing an example of Henoch's purpura in a pale, shocked, very ill child with severe abdominal pain and a few purpuric spots. She was in a ward in Great Ormond Street Hospital, London. The milder manifestations of gastro-intestinal allergy usually take the form of colicky abdominal pain, with or without diarrhoea and vomiting, and perhaps urticaria or eczematous areas or respiratory manifestations may occur at the same time. I believe that ingested foods are the causative factor here. It is of vital importance to distinguish these attacks from such organic conditions as

intussusception, pylorospasm or atypical appendicitis. In doubtful cases, examination of a blood film may help to prove or disprove the presence of an allergic reaction, as a blood film when allergy is present in any form will show excess of eosinophile cells.

Food Hypersensitivity.

Food hypersensitivity is a problem in infancy as well as in later childhood. We are all familiar with the baby who will give a severe local reaction to some new food. His mouth and skin may become reddened, swollen or even blistered on contact with this food—for example, egg white.

I had one patient who found out this sensitivity in her child by accident. She had the baby in his perambulator in the kitchen while she was cooking; the baby leaned over, picked up an egg, broke the shell and spilt the contents over his hands and wiped them on his face. Almost immediately the child's mouth became blistered and his whole face swollen, so that he could hardly see out of his eyes, and a general redness spread over all skin areas which the raw egg white had touched. In later childhood this boy suffered from occasional attacks of asthma.

Migraine.

Genuine migraine, with headache which is unilateral, and also nausea, vomiting and ophthalmic manifestations, does sometimes occur in young children. Here also one must be sure of the diagnosis, lest an organic lesion such as an early cerebral tumour is overlooked. I have encountered a number of genuine cases of migraine in childhood; the children so afflicted are frequently members of an allergic family. Treatment is difficult. The administration of ergotamine tartrate and other symptomatic treatment will help during an attack, anti-allergic measures are advised, and added glucose in my experience seems to lessen the number of attacks. The glucose gives the child quickly available carbohydrate for its energy requirements, instead of its having to exhaust its supplies of liver glycogen.

Enuresis.

The presence of allergy is one theory in the causation of enuresis. There are many theories on this subject, and this one is worth passing mention. The cause of enuresis in an allergic child may well be some irritant allergen—for example, kapok pillows or mattresses, or some allergenic food ingested during the day. The accepted mode of action is that the offending allergen gains access to the blood-stream and stimulates the pelvic division of the parasympathetic nervous system, causing relaxation of the neck of the bladder and discharge of urine.

Conclusion.

Allergy in childhood is a most elusive and fascinating subject, and I fear that I have but touched on its manifestations in this paper.

Reports of Cases.

MALATHION INTOXICATION.

By M. N. I. WALTERS,

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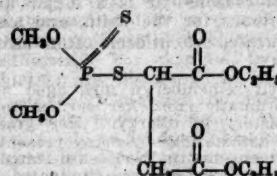
SINCE the introduction of the organic phosphate anticholinesterase compounds in treatment of *myasthenia gravis* and glaucoma (Grob and Harvey, 1949), and with the extension of the use of these and related compounds as pesticides, numerous papers have appeared on the toxicology of parathion (p-nitrophenyl diethylthionophosphate) (Grob *et alii*, 1949; Grob, Garlick and Harvey, 1950). Dangers related to the altered physiology at the myo-neural junction were forecast at least as early as 1950 (editorial, 1950).

A more recently developed organic phosphate anticholinesterase, malathion, was mentioned in passing in a former

paper in this journal (McQueen, 1956), and its pharmacological effects were likened to those of the commoner compounds—namely, parathion, HEPT and TEPP. A search of the literature available has failed to produce a clinical report of malathion intoxication in man. Because of the widespread use of pesticide preparations containing this drug, a note in this regard was deemed appropriate.

Toxicology of Malathion.

Malathion (malathion) (O, o-dimethyl dithiophosphate of diethyl mercaptosuccinate) has the following structural formula:



It is described (Haselton and Holland, 1953) as "a yellow brown liquid with a high boiling point and a low vapor pressure . . . only slightly water soluble, but miscible in many organic solvents". The principal pharmacological action is anticholinesterase activity. Alimentary absorption is enhanced after ingestion of the drug in association with vegetable oils. When it is administered by mouth in toxic doses to animals "salivation, depression and tremors predominate". Unless death supervened within hours, recovery was complete. Inhalation of malathion vapor caused pulmonary hyperemia with hemorrhagic areas. The toxicity of malathion in experimental animals has been reviewed by Holland, Haselton and Hansal (1953).

As with related compounds, parathion and HEPT, the pharmacological action of malathion is at the myo-neural junction, where it acts as a cholinesterase competitor, causing the accumulation of acetyl choline. Systemic effects may therefore resemble those of muscarine or nicotine.

Commercially malathion can be obtained as malathion 50, which is composed of 50% malathion technical and 50% solvent X7 (toluol/xylol). Malathion fly spray consists of only 3% malathion 50, together with a non-ionic emulsifier, there being only a small amount of organic solvent present.

The following is a case report of ingestion of malathion fly spray by a woman.

Clinical Record.

On June 27, 1956, at 5.30 p.m., a housewife, aged thirty-five years, discovered that she was suffering from toothache after consuming a small amount of alcohol. In order to alleviate the pain she resorted to the unusual expedient of swabbing the offending tooth with malathion fly spray. Because of the lack of analgesic response she drank the remainder of the malathion, approximately 16 ounces in quantity. Fortunately she had told her husband of her actions, and three hours later she was brought to the casualty department of the Royal Perth Hospital. In transit the patient had lost consciousness and had both defecated and micturated involuntarily.

When she was examined in the casualty department the patient had regained consciousness, but was confused, being unable to give an account of herself, and she smelt of a benzine-like substance. Her actions were like those of an inebriated person. She had much constricted pupils, there being no reaction to light or accommodation. There were no burns about the mouth, nor were there any abnormalities apparent at that time in either the cardio-vascular or neurological systems.

About thirty minutes after her arrival in hospital the patient again lost consciousness and displayed cyanosis of the central type. However, the respirations remained regular and were neither increased or decreased in number or depth. There was no associated cardio-vascular collapse. The urinary bladder was found to be palpable almost to the umbilicus. The patient's limbs were now completely flaccid, with absence of deep tendon reflexes; however, the

intercostal muscles and diaphragm were working normally. There then followed the sudden surprising regurgitation of great quantities of dark liquorice-coloured fluid containing particles of food. This poured from the patient's mouth in a seemingly unending stream, and in approximately twenty minutes over 50 ounces had been collected. The whole episode was somewhat reminiscent of an attack of acute gastric dilatation.

Atropine (1/50 grain) was administered subcutaneously, and 1/150 grain was also given by an intragastric tube. Seconds later mydriasis resulted. There was no effect on the pulse rate. Three hours later (four hours after ingestion of the malathion) the patient was conscious, complaining only of nausea and dryness of the mouth. Her pupils were dilated and reacted to light reflexes.

The only immediate sequel to this toxic episode was the development of signs of consolidation at the base of the right lung associated with a rise in temperature to 99.4° F., undoubtedly due to aspiration of regurgitated fluid. She had been given prophylactic treatment with penicillin, and with this antibiotic together with physiotherapy she improved sufficiently to be discharged from hospital after thirteen days, suffering no residual consequences of either the malathion poisoning or the aspiration pneumonia.

Investigations performed the morning after her admission to hospital gave no significant findings; the blood picture was entirely normal, and the urine contained neither cells nor casts on microscopic examination. The serum electrolyte contents in milliequivalents per litre were as follows: sodium 142, potassium 3.6, chloride 116, and carbon dioxide combining power 20.

Discussion.

The relevant features of this patient's illness—namely, (a) pupillary changes, (b) unconsciousness, (c) cyanosis, (d) spontaneous defecation and micturition, (e) loss of tone of gastric, vesical and possibly of upper intestinal smooth muscle, and (f) paresis of voluntary muscles, with sparing of the intercostals, diaphragm and bulbar muscles—are comparable with manifestations of mild to moderate intoxication due to other organic phosphates such as parathion and HEPT, there being evidence of both muscarine and nicotine effects (Meyler, 1952). The early effects (McQueen, 1956) of muscarine action include anorexia, nausea and vomiting, abdominal colic, sweating, salivation, melosis and involuntary defecation and micturition. Later, pulmonary edema and respiratory failure from diaphragmatic and intercostal paresis may occur. Nicotine effects may include both fine and coarse tremors, restlessness, headache, mental confusion and coma.

The toxic effects of malathion in this case may be grouped as follows: (1) muscarine-like effects: melosis, nausea, involuntary defecation and micturition, sialorrhoea and outpouring of gastric secretions; (2) nicotine-like effects: unconsciousness, restlessness and flaccidity. The patchy distribution of synaptic effects was of interest.

Malathion is far less toxic than parathion because of poor alimentary absorption.

The immediate effect of atropine in overcoming the melosis and to a lesser extent the gastric succorrhoea is noted.

Summary.

A case of malathion intoxication due to ingestion of the drug in the form of commercial fly spray is presented. The literature on the toxicology of this drug is briefly reviewed, together with a comparison of its actions with other more toxic organic phosphate anticholinesterase compounds. Malathion is a readily available, widely used pesticide, and it is to be anticipated that similar cases of poisoning will be encountered from time to time. The importance of the prompt use of atropine, an immediately effective antidote, is stressed.

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ANEURYSMS ON A HOMOLOGOUS AORTIC GRAFT: A SEQUEL.

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With a Pathological Report by A. PALMER,
Sydney.

ARTERIAL GRAFTING is now a well-established procedure, and satisfactory methods of removing cadaveric blood vessels and of preserving them have been evolved. Recently Sharp (1955) and Susman (1955) have added two cases



FIGURE 1.

Upper part of specimen showing graft on which two new aneurysms have arisen (A and A). In the lower half of the photograph the original aneurysm (OA) lies behind the graft. The upper suture line of the graft is situated 1.5 inches below the renal arteries (R and R).

to the growing list of successful graftings to replace aortic aneurysms, and have since then successfully operated in a third. The first of these patients is well except for the loss

of several toes from dry gangrene. The second man made a good recovery after a trying convalescence complicated by acute dilatation of the stomach and hæmolytic jaundice. It is to be noted that the aneurysm was left in place, with the graft resting on its surface. He was discharged from hospital nine weeks after operation, free of pain and feeling well in spite of severe hypertension and general vascular degeneration. One day, two weeks later, he was



FIGURE II.

Lower half of the specimen, showing the graft consisting of the lower end of the aorta and the common iliac arteries. S denotes the suture line in the left common iliac artery. The suture line in the right common iliac artery is at a corresponding level. OA indicates the original aneurysm still lying behind the graft.

throwing sticks for his dog to pick up and suffered sudden and severe abdominal pain. He made his own way home; there he was examined by his family doctor, who correctly diagnosed intraabdominal hæmorrhage and sent him by ambulance to Sydney Hospital, a distance of about one hundred miles. On his admission to hospital, he was moderately shocked but not desperately ill; he had little pain, but tenderness, distension and slight rigidity of the whole abdomen were present. Secondary anemia was corrected with slow blood transfusions, and he was kept under careful observation. Two days later, after recurrence of pain and shock, his abdomen was opened. The peritoneal cavity was full of fluid and clotted blood, which was removed with sucker and pads. I could find no obvious bleeding, and as the patient was faring badly I closed the abdomen without more ado. He made a good immediate recovery, but died two days later with signs of another hæmorrhage. Autopsy revealed much blood in the peritoneal cavity and some in the retroperitoneal tissues. The aorta was divided above the celiac axis, and both femoral vessels were divided low down, so that the mass consisting of the aneurysm and the overlying graft was removed intact. The three anastomoses were secure, but there were two saccular



FIGURE III.

Photograph of one of the new aneurysms which developed on the graft (x8).



FIGURE IV.

Photomicrograph of the edge of one of the new aneurysms which developed on the graft. Some suture material which has partly torn out in making the section can be seen near the lower central part of the photograph. It is thought that the aneurysms developed at the site of ligation of small branches on the graft, and that this suture material is part of a ligature. (x25.)

aneurysms on the antero-lateral aspect of the aortic portion of the graft, one of which had apparently arisen at the origin of an aortic branch. This aneurysm was surrounded by a hæmatoma about an inch in diameter and was probably the source of the bleeding, although there was no gross rupture.

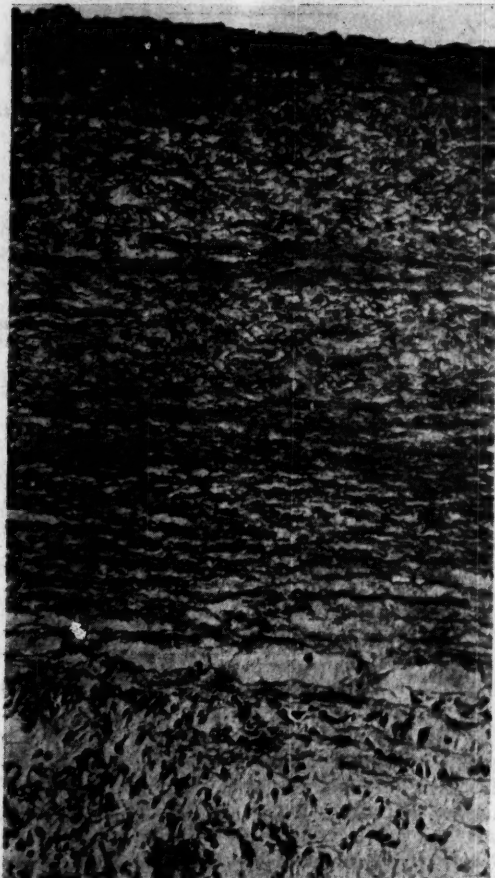


FIGURE V.

Photomicrograph of graft. The media of the graft resembles necrotic tissue. Near the intimal surface there are some nuclei which stain and are presumably of host origin. On the adventitial surface the graft merges with fibrous tissue of healthy appearance with little evidence of reaction. (Hæmatoxylin and eosin stain, $\times 120$ approximately.)

Pathological Report (A.P.).

A post-mortem examination was performed nine hours after death. The relevant findings were as follows:

The heart weighed 13 ounces. The pericardium was adherent in a patchy manner. There was no excess fluid. The slight enlargement was due to hypertrophy of the left ventricle. The valves and orifices were normal. Examination of the coronary arteries revealed slight atheroma near their origins with little narrowing. There was no evident fibrosis of the myocardium. The arch of the aorta was a little dilated, and showed moderate atheroma without ulceration or calcification.

The peritoneal cavity contained rather more than 80 ounces of free fluid, blood and clot.

There was a large aneurysm of the lower end of the aorta, commencing 1.5 inches below the renal arteries and extending down to involve both common iliac arteries; the aneurysm measured three inches in maximum diameter;

it had been ligated above and below and short-circuited by a graft. The three suture lines of the anastomosis appeared to be perfectly healed. There were two aneurysmal dilations on the graft; one of these was about one inch below the upper suture line and was the site from which the hæmorrhage had occurred. A suture was found in the wall of one of these aneurysmal dilations, suggesting that it had arisen where a branch of the graft had been tied off.

Microscopic examination revealed severe atheroma of the thoracic and abdominal aorta. Parts of the wall of the original abdominal aortic aneurysm consisted of fibrous tissue without muscle or elastic tissue and with atheromatous deposits in the inner layers.

The media of the graft resembled necrotic tissue, but in places some nuclei, which stained and were presumably of host origin, were present near the intimal surface. On the adventitial surface the graft merged with the host tissues, and there was fibrous tissue of healthy appearance with remarkably little evidence of reaction to the adjacent necrotic tissue. At one suture line young fibrous tissue, continuous with that of an atheromatous plaque in the host aorta, had grown over the intimal surface of the graft. On other parts of the intimal surface of the graft there was a little fibrin in which a few degenerating polymorphonuclear cells, some mononuclear phagocytes and occasional fibroblasts could be found. The elastic tissue of the graft was well preserved in some places, and poorly preserved and apparently fragmented in others. There was evidence of a little inflammation around some of the sutures.

The small aneurysms in the graft contained laminated thrombus and had walls composed almost entirely of fibrous tissue. The appearance supported the view that these new aneurysms had arisen in ligated branches.

In the kidney there was hypertensive nephrosclerosis with severe hyaline change in afferent arterioles, but only moderate fibrosis.

In the stomach there was a small subacute peptic ulcer, and examination of an artery nearby revealed severe fibrinoid degeneration of part of its wall.

The final diagnosis was as follows: (i) atheromatous aneurysm of the abdominal aorta and common iliac arteries, by-passed by an aortic graft with the development of aneurysms in the graft, one rupturing with fatal retroperitoneal and intraperitoneal hæmorrhage; (ii) hypertension with mild nephrosclerosis and widespread arteriosclerosis; (iii) a small subacute gastric ulcer.

Discussion.

The development of aneurysms on a graft, especially so soon after its insertion, is disconcerting. Gwathmey and Thompson (1955) have reported the occurrence of a localized aneurysmal dilatation on a graft close to the anastomosis; the graft had been used to replace a fusiform aneurysm of the lower part of the thoracic aorta twelve months previously. The new aneurysm was excised and a plastic graft was successfully inserted. Gwathmey and Thompson state that "to our knowledge there had been no report of the development of an aneurysm on a homologous aortic graft in man", although there have been many in experimental animals. This patient and my patient were both hypertensive. Neither graft was treated with ethylene oxide, which has been blamed for some of the aneurysms of experimental animals. It is almost certain that other examples of aneurysms arising on grafts will soon be reported, and it may be possible to find the causative factors; hypertension may be one of these factors. The incidence of aneurysms on homologous grafts may prove to be so high that in future preference will be given to plastic grafts.

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- GWATHMEY, O. and THOMPSON, C. (1955), "Aneurysm Formation in a Homologous Aortic Graft in a Human", *J. Thoracic Surg.*, 30: 218.
- SHARP, A. (1955), "Abdominal Aortic Aneurysm: Resection of Bifurcation and Homografting (with Hypothermia)", *M. J. AUSTRALIA*, 2: 125.
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Reviews.

The Person Behind the Disease. By Julius Bauer, M.D., F.A.C.P.; 1956. New York and London: Grune and Stratton, Incorporated. 8½" x 5½", pp. 144, with illustrations. Price: \$3.50.

THE objective of this book, according to the author's preface, is to elaborate on the fundamental principles of an holistic concept of medicine. He points out that such a concept is not new, as it dates back to Plato, but modern knowledge has brought quite a different approach to it. His particular thesis is that the holistic concept of a person, both in health and disease, is a necessity, since the uniqueness of the individual has a genetic basis laid down at the moment of fertilization of the ovum. The genes, as the main carriers of individual constitutional characteristics, form an inseparable unit in the fertilized ovum, but they remain a unit also in the mature person, though lodged and acting in all his different parts, organs and tissues. Bauer works this idea out in considerable detail. The result is thoughtful and thought-provoking, whether one agrees with it entirely or not.

Soybeans: For Health, Longevity and Economy. By Philip S. Chen, Ph.D., with the assistance of Helen D. Chen, M.A.; 1956. South Lancaster, Massachusetts: The Chemical Elements. 8" x 5½", pp. 265, with illustrations. Price: \$3.00.

THE soybean, for long a staple source of food in much of the Orient, is fast becoming an important source of a good quality protein throughout the world. There is much need for a detailed and accurate account of the soybean, its sources, its chemical composition and its uses for food. P. S. Chen has produced a book which attempts to provide this information, with the title "Soybeans for Health, Longevity and Economy".

A great deal of information is given in this book, much of which is from reliable sources; but the author is uncritical in his acceptance of statements, many of which read like testimonials for a patent medicine. This is a pity, for much of the wanted information is here, and a critical editing of the material could have produced a good book. The production and uses of soy milk, which is of great importance in many countries at the present time, is treated very briefly.

About one-third of the book is taken up with recipes in which soy flour or some other product of the soybean is used.

The book gives the fullest information on the soybean as a source of food of any book now available; but many things have been left out, such as the toxic effect of untreated soy flour in some conditions and methods for removing this toxicity. The extensive use of treated soy flour in the preparation of infant foods in Germany and other countries is not mentioned. If the book is used critically, it can be a useful source of information on many aspects of the soybean; but it cannot be recommended as an authoritative account.

Notes on Books, Current Journals and New Appliances.

Premier Symposium de la Fondation Valentino Baldacci (Madrid, 27-30 Mai 1955): Hémorragie spontanée, plaquettes sanguines et parois vasculaires. Published by J. Roskam; 1956. Pisa: Omnia Medica Editore. 9½" x 6½", pp. 192, with five illustrations. Price:

From May 27 to May 30, 1955, there was held in Madrid a symposium on hematology, the first one to be held under the auspices of the Valentino Baldacci Foundation. Twelve physiologists and pathologists met to discuss the action of platelets and blood vessels in the spontaneous cessation of bleeding. This book, which records the proceedings, has considerable interest for hematologists as it covers a particular field of hematology adequately.

A Therapeutic Index. By C. M. Miller, M.D. (Lond.), M.R.C.P. (Lond.), and B. K. Ellenbogen, M.D. (Liverpool), M.R.C.P. (Lond.); Second Edition; 1957. London: Baillière, Tindall and Cox. 7½" x 4½", pp. 168. Price: 12s. 6d.

This little book tends to fall between two stools. It is not a text-book of therapeutics, and its authors do not

suggest that it is, yet as an *aide-memoire* it tends to cover too much ground. It is made up of a series of short notes on the management of various conditions arranged in an alphabetical order. However, for the student and for the newly qualified doctor, it may well provide some practical comfort at critical moments. One disadvantage from the Australian viewpoint is that the book assumes familiarity with and access to the British National Formulary.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Cold Injury: Transactions of the Fourth Conference, November 7, 8 and 9, 1955, Princeton, N.J.," edited by M. René Ferrer, M.D.; 1956. New York: The Josiah Macy, Jr. Foundation. 9" x 6", pp. 374, with 124 illustrations. Price: \$5.95.

Contains twelve discussions on various aspects of the investigation of cold injury.

"The Unconscious Motives of War: A Psycho-Analytical Contribution," by Alix Strachey; 1957. London: George Allen and Unwin, Limited. 8½" x 5½", pp. 288. Price: 25s.

A Freudian interpretation of the psychological motives that lie behind the persistence of war.

"Gestation: Transactions of the Third Conference, March 6, 7 and 8, 1956, Princeton, N.J.," edited by Claude A. Villee, Ph.D.; 1957. New York: The Josiah Macy, Jr. Foundation. 9" x 6", pp. 256, with 84 illustrations. Price: \$4.75.

Contains papers and discussions on maternal endocrine secretions, maternal hormones in pregnancy, ovulation cycles and stress, the secretion of various hormones and the activity of the adrenal cortex in pregnancy, steroidogenesis in perfused human placentas, the effect of hormones on cellular metabolism, the aetiology of gonadal agencies and sex reversal, the secretory activities of fetal endocrine glands, the influence of hormones on sex differentiation in explanted fetal reproductive tracts, the effect of fetal endocrines on fetal growth and the interrelations of pituitary functions and pregnancy.

"Developmental Abnormalities of the Eye," by Ida Mann, C.B.E., M.A. (Oxon.), D.Sc., M.B., B.S. (Lond.), F.R.C.S. (Eng.), F.R.A.C.S.; Second Edition; 1957. London: British Medical Association. 9½" x 6", pp. 432, with 284 illustrations. Price: 90s.

A new edition of an accepted classic in ophthalmology.

"Dynamics of Psychotherapy: The Psychology of Personality Change: Volume 2," by Percival M. Symonds, Ph.D.; 1957. New York and London: Grune and Stratton. 9" x 6", pp. 269. Price: \$6.50.

The second of three volumes, entitled "Dynamics of Psychotherapy", dealing with the motivational forces in psychotherapy. Volume I was subtitled "Principles".

"The Medical Clinics of North America: Nationwide Number: March, 1957: Efficacy of New Drugs," by Howard F. Conn, M.D.; 1957. Philadelphia and London: W. B. Saunders Company. 9" x 6", pp. 343, with 34 illustrations. Price: cloth binding, £8 2s. 6d.; paper binding, £6 15s.

Contains 21 articles on new drugs with a list of proprietary names and generic or chemical names.

"The Teaching of Hygiene and Public Health in Europe: A Review of Trends in Undergraduate and Post-Graduate Education in Nineteen Countries," by F. Grundy, M.D., M.R.C.P., D.P.H., and J. M. Mackintosh, M.D., LL.D., F.R.C.P., D.P.H.; 1957. Geneva: World Health Organisation. 9½" x 6½", pp. 256. Price: £1 5s.

"An attempt to present a balanced picture of the present-day scene in this regard for part of Europe."

"Expert Committee on Rabies: Third Report," World Health Organisation Technical Report Series Number 321; 1957. Geneva: World Health Organisation. 9½" x 6½", pp. 52. Price: 1s. 9d.

Report of the third session of the committee held in November-December, 1956.

The Medical Journal of Australia

SATURDAY, JUNE 22, 1957.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE IMPORTANCE OF POLYUNSATURATED FATTY ACIDS IN NUTRITION.

IDEAS as to the importance of unsaturated fatty acids, with two or more double bonds, in human nutrition have, for the past few years, been very much in medical news and have been responsible for considerable differences of opinion in the interpretation of experimental work. In 1929, G. O. Burr and M. M. Burr demonstrated the fact that three of the unsaturated fatty acids, linoleic with two double bonds, linolenic with three double bonds and arachidonic with four double bonds, cannot be synthesized in the animal body in amounts sufficient to supply metabolic needs. They called these acids "essential fatty acids". It seems that arachidonic acid is the really important fatty acid, and this can be produced in the body from the other two acids, provided there is an adequate amount of pyridoxine. The requirements for these fatty acids have been proved for many different kinds of animals, but there has been no clear demonstration that man ever suffers from shortage of them; indeed it would be difficult to prepare a diet, which would be palatable to man for any length of time, which did not contain sufficient of these acids. It has been claimed that some forms of eczema in man are associated with lowering of the content of unsaturated fatty acids in the blood serum, but evidence that the administration of oils, such as corn oil, rich in linoleic acid, has any beneficial effects in these cases is not good.

The main point of interest in the unsaturated fatty acids, at the present time, is the supposed relationship between the intake of fatty acids and the concentrations of cholesterol and certain lipoproteins in the blood and the

effect of these on the development of atherosclerosis and coronary disease. It has been claimed by many observers that, when saturated fatty acids, such as palmitic and stearic acids, and monounsaturated acids, such as oleic acid, form the greater part of the fatty acids absorbed from the intestine, the blood cholesterol content is high. When, however, there is a high percentage of linoleic acid in the diet, the blood cholesterol content is much lower. It is believed by many that high blood cholesterol values are the cause of atherosclerosis and coronary disease. Last year H. M. Sinclair¹ made extensive claims that deficiency of unsaturated fatty acids in the diet was responsible for coronary disease and a number of other diseases. His evidence does not seem to be very convincing and was strongly criticized by Ancel Keys.² With co-workers, Ancel Keys later reported extensive experiments with vegetable oils³ which confirmed the previously reported claims that vegetable fats rich in linoleic acid reduce the blood cholesterol content, but it was found that corn oil with 45% of linoleic acid reduced the content of cholesterol in the blood to a greater extent than did sunflower oil with 61% of linoleic acid and safflower oil with 74%. Bronte-Stewart and others⁴ gave evidence that animal fats but not vegetable fats raised the level of cholesterol in the blood.

The most extensive series of experiments in this connexion have recently been reported by E. H. Ahrens and others.⁵ They have studied the effects of many different animal and vegetable fats in a very careful and detailed manner and have found that vegetable oils as the sole source of fatty acids produce lower blood cholesterol figures than animal fats. They make an important statement: "Our readiness to accept the unsaturation hypothesis as firmly proven has been tempered by the realisation that none of the experiments performed here or elsewhere has ruled out the possibility that the factors sought may lie in the non-glyceride portion of the fed fats." Several workers have claimed that administration of sitosterol, a steroid related to cholesterol and found in most vegetable oils, may reduce the blood cholesterol content, but large doses seem to be necessary. J. M. R. Beveridge *et alii* (1927) are quoted by Ahrens and his colleagues as stating that the "plasma cholesterol depressant effect of corn oil depends to a large extent upon its sterol content".

Ancel Keys and others (in a letter to the editor of *The Lancet*)⁶ bring forward further evidence that corn oil has an effect additional to that which may be ascribed to its fatty acid content while not denying that the linoleic acid it contains has an effect. A. T. James *et alii* have contributed a new approach to the question of the relationship of the fatty acids of the blood and the content of cholesterol in patients with well-defined coronary disease as compared with apparently normal people. Patients and normal subjects were paired as to age and sex, and the fatty acids of the red blood corpuscles, the separated plasma phospholipids and the acetone-soluble fraction of the plasma lipids were separated and determined. Twelve patients and twelve normal subjects of ages from forty to

¹ *Lancet*, April 7, 1956.

² *Lancet*, April 28, 1956.

³ *Lancet*, January 12, 1957.

⁴ *Lancet*, April 28, 1956.

⁵ *Lancet*, May 11, 1957.

⁶ *Lancet*, May 11, 1957.

fifty-one years were studied. No detectable differences were found between the patients and the normal subjects in the blood content of saturated and unsaturated fatty acids, except that in the patients the ratio of oleic to stearic acids was somewhat higher than in the normal subjects. "These observations do not support the hypothesis that deficiency of these 'essential fatty acids' is a factor in the genesis of coronary-artery disease."

How is the nature of the fatty acids in the diet supposed to be related to the blood content of cholesterol? It is commonly claimed that animal fats operate by increasing absorption of cholesterol. Feeding cholesterol in large amounts to rabbits does bring about the appearance of atherosclerosis, but rabbits do not normally meet cholesterol in their diet. In man there is no means of determining what is the absorption of cholesterol, whether dietary or biliary, from the gut; indeed, often the sterol derivatives in the faeces exceed in amount the cholesterol in the diet. W. Dock, quoted in these columns on May 4, 1957, has criticized the resistance of many clinicians to the dietary cholesterol theory of atherosclerosis, but one may perhaps ask for better evidence than is at present available. What is the evidence that patients with coronary diseases are clinically improved when their serum lipids are held continuously at a lower level by diets rich in linoleic acid? So far no satisfactory observations on this point seem to have been made. Ahrens *et alii* state that their patients seemed to show considerable improvement while under their care, but they believe that this is primarily due to daily medical attention and other factors associated with hospital and experimental treatment. Suggestion can play a large part in coronary disease. That increase in the cholesterol content of the blood is the cause of atherosclerosis has been doubted by many. It is true that, in general, patients with diagnosable coronary disease usually have a higher level of blood cholesterol than apparently normal people. Unfortunately it is not yet possible to diagnose atherosclerosis during life until the condition is well advanced.

Some recent pathological studies on atheromatous changes found in vessels *post mortem* may help to throw light on the aetiology of atherosclerosis. N. L. Noble, R. J. Boucek and K. Y. T. Kao¹ have made biochemical observations on atheromatous patches removed from the intima of the aorta of men and women after death. Normal intima, early atheromatous changes and advanced atheromatous changes were examined. The earliest biochemical alterations observed were an increase in the concentration of collagen and an increase of binding of hexosamine with scleroprotein. No significant elevation of lipids occurred in the early atheromatous areas. In the advanced areas there was increase, due in the male to elevated cholesterol concentration, but in the female to elevation of other lipid concentrations as well. The investigation shows clearly that the accumulation of cholesterol in the atheromatous areas is not an early or even an essential event in the development of atheroma. N. E. Clarke, C. N. Clarke and R. E. Mosher² claim that the sequence of events in a developing atheromatous area is as follows. The inner walls of the arteries become damaged for some, at present, unknown reason, and the reparative processes go wrong

because of changes in the mucoid ground substances. This material, high in polysaccharide and chondroitin sulphate content, is capable of fixing large quantities of cholesterol and calcium. Clearly the causes of atherosclerosis and coronary disease are not yet known, nor is the function of unsaturated fatty acids in the human body.

Current Comment.

FORENSIC MEDICINE IN FRANCE IN 1846.

TEXT-BOOKS of forensic medicine can make very dramatic reading even for those who are not members of the medical profession. If they are illustrated they may make the stoutest heart quail, for the medico-legal problems whose solution is discussed are often ghastly to say the least of it. It has been said that the aim of forensic medicine is to aid in sheeting home the crime to the criminal and establishing the innocence of the innocent. Roger Vaultier,¹ who has presented a number of quaint sidelights on medical history in France, has by chance come upon a small book published in 1847 (towards the end of the reign of Louis-Philippe) by two doctors, Isnard and Dieu. They were professors at the Military Hospital at Metz and also members of the medical society of La Moselle, and they present the result of their analyses and autopsies carried out in the preceding year. Considerable interest attaches to their description of the necessary qualifications for a medico-legal expert. They consider that he must have sound judgement, he must lay aside all personal pride in order, if need be, to remain in doubt. He must have "exquisite" honesty and a considerable experience in criminal cases. They take the unusual view that legal medicine is not a specialty from the point of view of the knowledge which it requires, but rather from the point of view of its application. In illustration of this opinion they state that an obstetrician can carry out a confinement quite competently although he does not know the anatomy of the uterus in great detail, but that on the other hand the simplest problems of abortion or infanticide are insoluble to anyone who does not sufficiently understand the physiology of conception, pregnancy and parturition. Isnard and Dieu insist that the autopsy is of prime importance even though it has to be carried out in bad conditions. (In this connexion one wonders whether the influence of Laennec, who had died twenty years previously, may be detected. It has been said of Laennec that his method of correlating the clinical signs observed during life with the lesions found on dissection after death is his chief contribution to science.) Dieu and Isnard then discuss the question of abortion. The suppression by the law of 1810 of the towers where unmarried mothers could abandon their babies with absolute anonymity, was one of the reasons for the increase in this type of crime.

After this general introduction the two doctors present a résumé of their observations. Vaultier has chosen four problems. The first concerned the suspicion of attempted rape of a small country girl, aged ten years, and the careful, methodical investigation carried out by our two experts would have done credit to a Sherlock Holmes or a John Thorndyke. Regrettably they stated that they could give no definite answer. The next problem concerned a prostitute accused of stealing, whose conduct was "thoughtless and disorderly", and whose mind "was nourished by the reading of novels and poetry". Without being able to carry out a complete examination, our experts gave it as their opinion that this woman was suffering from an abnormality or some type of disease of the cervix uteri, or at least from hyperexcitation of that organ, a condition which would greatly influence the exercise of her intellectual faculties. They considered that from that state

¹ *Circulation*, March, 1957.

² *Am. J. M. Sc.*, December, 1956.

¹ *Presse méd.*, March 27, 1957.

of permanent hyperexcitation to madness there was only one step. They could not say that she was mad, because everything that she said was rational. The next case was that of an unfortunate country girl who had been seduced. In order to procure an abortion she had placed a great number of leeches around the external genitals. By careful observation, reasoning and deduction Isnard and Dieu came to the conclusion that if she had been pregnant, she still was so. In 1847 they learnt, not without satisfaction, that the girl had given birth to a living infant at term. The final case is that of a baby, whose dead body was found on the banks of the Moselle at Malroy on March 24, 1846. The autopsy was officially requested on March 27. Our medico-legal expert took back to Metz a portion of the viscera and proceeded to analyse the lungs, which he placed in water. He concluded that the child had breathed, because crepitations were present in the lungs, which were filled with gas. Moreover, the gas was found to be atmospheric air. The lungs, the heart and the thymus together weighed 88 grammes, a weight remarkably like that of the same organs in a fetus which has breathed. The *foramen ovale* was not gaping, the lungs were not engorged with blood, as happens at the onset of red hepatization, and finally the sigmoid colon contained yellow, formed, faecal material. There was no meconium in the intestine, and the umbilical cord did not appear to be preparing to drop off, as it usually is on the third or fourth day. The child's skin was pale, putrefaction was not far advanced, in fact everything suggested that maceration had taken place in running water. It was considered that death had occurred fifteen days previously and that the body had been in the water for ten days. The body had been dismembered; the lower limbs had been cut off with a sharp instrument, apparently on a block or a table. Obviously the child was already dead, as there had been no hemorrhage. The heart contained black blood clots, of the consistency of currant jelly. There was no sign of violence on the body, and the liver was not enlarged and was rather slate-coloured than red. Dieu and Isnard summarized their findings by stating that they had been unable to determine the cause of death, that the child had been born at term, that it was a female, that it had breathed, that it had lived for more than one day and for less than four days. It had been in the water for twelve days, it had been cut in two pieces *post mortem*. They could only suggest that its death was due to asphyxia. Vaultier concludes his account of this interesting document by stating that recent progress in legal medicine (the history of which, in his opinion, is not sufficiently studied) would certainly make it possible to find the answer to this problem, which is more than a century old. Perhaps medical practitioners who are well versed in detective fiction may care to give it their attention.

NASO-PHARYNGEAL CANCER.

It is generally believed that our major weapon in treating cancer is early diagnosis, and most people would agree that improvement in the cure rate can be achieved at this moment only by earlier diagnosis. In some malignant conditions the diagnosis is all too often made extremely late. Of these conditions, cancer of the naso-pharynx is a good example. The causes of the delay are several: the patient may notice nothing amiss; the patient may consider his symptoms trivial; or the doctor may consider the symptoms trivial. R. A. Chakravorty and M. R. Ewing,¹ who have studied this problem, are of the opinion that in naso-pharyngeal cancer the delay is attributable to the doctor, but perhaps with good reason. The reasons which Chakravorty and Ewing give are as follows. First, naso-pharyngeal carcinoma is a great rarity in the Western world, and indeed the total number of deaths reported in England and Wales in 1953 was only 100 in a population of some 50,000,000. The Christie Cancer Hospital and the Holt Radium Institute treated only 100 patients suffering from naso-pharyngeal cancer

in the years between 1932 and 1950. The incidence in Scandinavian countries is estimated to be 1:180,000. These figures would indicate that it is unlikely for a general practitioner to see more than one case in a lifetime of practice. Second, the clinical features are so variable that patients with naso-pharyngeal cancer may consult any one of a number of specialists. Third, even when the diagnosis of naso-pharyngeal cancer is considered, the anatomical and pathological properties of the cancer make its demonstration difficult.

Anatomically, the naso-pharyngeal cancer is remote and inaccessible. It is in fairly close relation with several cranial nerves and with the Eustachian tube. Pathologically, the naso-pharyngeal cancer is often very anaplastic, and the primary tumour is often microscopic in size in spite of extensive and distant metastases. Lymphatic spread is early and extensive; it is usually bilateral. On the contrary, the primary tumour may extend locally as a large necrotic mass, and invade the surrounding structures and in particular the cranial nerves. If only these considerations are borne in mind, it would seem that the presenting features of a naso-pharyngeal cancer will occasion no undue diagnostic difficulty. However, the commonest presenting features are nasal obstruction, deafness, tinnitus and nasal discharge; these symptoms are a commonplace in practice, and in all conscience could demand and receive only symptomatic diagnosis and treatment. The late signs are much more dramatic and usually involve cranial nerves, the motor supply of the eye being affected first.

Once the disease has been suspected, Chakravorty and Ewing advise examination of the naso-pharynx, using a method which involves a fine rubber catheter. After the nose and throat have been anesthetized, the ends of a fine rubber catheter are passed, one down each nostril, and delivered through the mouth. Traction on the ends makes examination of the naso-pharynx much easier by pulling forward the soft palate. This method of examination appears to have an application beyond that of searching for a cancer. It is well known that a mirror examination, with the soft palate in its normal position, is unsatisfactory, and the finger in examination is not much better, or even worse, in that it is misleading. Although most doctors will see at the most only one naso-pharyngeal cancer in their career, it would be a great pity to misdiagnose it. A wider application of a satisfactory method of examination would help to ensure this. A broad knowledge of medicine is also needed to ensure that the possible causes of any spectrum of signs and symptoms are always in mind.

The paper by Chakravorty and Ewing seems to be a good example of the perpetually widening horizons of medicine, in that many cryptic or bizarre conditions may be considered in general practice, and the patients referred for further consultation. Examples which spring to mind are multiple myelomatosis, intracranial tumour, Hodgkin's disease, pancreatitis, non-specific mesenteric adenitis, porphyria and pheochromocytoma. There are many such examples; they emphasize that a precise and definite knowledge of the subjects upon which medicine is founded is needed, particularly as medicine becomes more complex and more difficult. The search for truth cannot be simplified or made easy, and the unsatisfactory position with regard to naso-pharyngeal cancer concerns us all.

THE COMMONWEALTH MEDICAL ADVISORY BUREAU.

The Empire Medical Advisory Bureau at British Medical Association House in London has moved forward with the times in changing its name to the Commonwealth Medical Advisory Bureau. This admirable institution has many services to offer visiting medical men and women. Those planning to visit England are strongly urged to get in touch with the Bureau as long as possible before leaving Australia.

¹ Brit. J. Surg., January, 1957.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Fate of *Mycobacterium Tuberculosis* in Mouse Tissues.

R. McCUNE AND R. TOMPSETT (*J. Exper. Med.*, November, 1956) have made observations on the fate of *Mycobacterium tuberculosis* in mouse tissues as determined by the microbial enumeration technique. They discuss the persistence of drug-susceptible bacilli in the tissues despite prolonged antimicrobial therapy. Groups of mice were inoculated intravenously with 0.2 millilitre of a 1/10 dilution of strain H37RV in 0.1% bovine albumin. Various therapeutic drugs were administered to the groups in ground food pellets, and the dosage was calculated from an average daily consumption of 4.0 grammes of food by a 20-gramme mouse. The animals were sacrificed, the organs weighed, and cultures made from a standard amount of tissue homogenate, and the resultant colonies on solid oleic acid-albumin agar were counted, the cultures being observed up to seven weeks of incubation. In the untreated animal, after some initial variations, the counts in lung and spleen were remarkably constant. In nine treated with streptomycin or isoniazid, there was a stabilizing effect at a lower level, and when the drugs were combined the level was distinctly lower than that of isoniazid alone; this was true of the spleen homogenates as well as of the lungs. Measurements of susceptibility to the drugs of the organism grown were then made. The influence was far less marked on the bacterial population in the spleen than on that in the lung, although the differences in the histological appearances were very slight. There appears to be a threshold size of bacterial population which, once reached, ensures progression of the lesion. The survival of the organisms represented persistence, not drug resistance. The drug pyrazinamide was the most effective tuberculostatic used.

Induction of Virulence in *Mycobacterium Tuberculosis*.

P. D. HART AND R. J. W. REES (*Brit. J. Exper. Path.*, August, 1956) record the induction of virulence in an avirulent strain of *Mycobacterium tuberculosis* by certain non-ionic surface active agents. Irregular changes in behaviour of an avirulent culture, H37Ra, had been observed in the presence of "Triton A 20"; but this substance was superseded by D4, one of chemically similar polyoxyethylene esters with an average of 20 ethylene oxide units per phenolic group, and much more uniform results were obtained. The culture was first grown in liquid medium containing 0.0027% "Triton A 20", then in 0.05% medium serially, subcultures for virulence testing and cord production being made each time. The colonial appearance changed from circumscribed smooth colonies to completely rough ones, and the mortality in mice changed to 11 out

of 12 in ten days from six out of 12 in thirty-three days, and cord formation was conspicuous. After five subcultures on solid media the ability to kill mice was maintained, and strains recovered from the animals continued to show virulence. The original strain decolorized methylene blue; the induced virulent strain showed low dehydrogenase activity, though the enzyme is merely unable to act by low permeability of the cell surface.

Pneumocystis Pneumonitis.

H. T. RUSSELL AND B. M. NELSON (*Am. J. Clin. Path.*, November, 1956) describe two fatal cases of pneumonitis in white American children, in which the causal organism was thought to be *Pneumocystis carinii*. In one, there was an acute illness ending in death on the sixth day. The older child was born of a mother who had previously undergone splenectomy for hemolytic anemia; the child, born by Caesarean section, had been jaundiced at birth, and appeared to be chronically ill when examined at fourteen months. She died after twenty-six days in hospital, with considerable cyanosis. At each autopsy the significant findings were in the lungs, where alveoli were filled with eosinophilic foaming material and cystic structures which stained by the periodic acid-Schiff technique. No cultures of these structures were obtained. The authors discuss the relationship of this condition to cytomegalic inclusion disease and interstitial plasma-cell pneumonia.

Multiplication of Herpes Virus.

J. V. T. GOSLING AND S. P. BEDSON (*Brit. J. Exper. Path.*, October, 1956) have made observations on the mode of multiplication of herpes virus. This work followed a series of experiments with psittacosis virus, which indicated that this large organism probably multiplied by binary fission and did not break into non-infective sub-units, as had been postulated. In tissue cultures of the Maitland type, special precautions had to be taken to remove unabsorbed virus by washing the cells, and the tissue-virus mixture was titrated on the chorio-allantoic membrane or in the guinea-pig skin. After six hours there was no fall in infective virus, and from eight to twenty-four hours there was a steady rise in titre. In infected cultures of dispersed chick embryo cells containing anti-herpetic serum to neutralize extracellular virus, the amounts detectable after three and six hours had declined to about one-tenth of the initial levels, but were measurable if large original infecting doses had been used. The authors discuss the implication of their experiment, and keep an open mind on the subject of the eclipse phase in virus multiplication.

Serological Studies of Encephalitis in Japan.

C. H. SOUTHAM (*J. Infect. Dis.*, September-October, 1956) has made serological studies of encephalitis in Japan, and discusses the formation of hemagglutination-inhibiting, complement-fixing and neutralising antibody following overt Japanese B encephalitis. Serial samples of serum were obtained from

patients in Tokyo hospitals, normal control sera from healthy schoolchildren in a northern rural district. It was found that hemagglutination-inhibition and complement-fixation techniques gave lower average titres in Japanese than in American patients, and neutralization techniques gave closer results. These variations were also noted in tests made in 1953. Hemagglutination-inhibiting antibody appeared early, on the fifth day of illness, in American patients; it was often delayed to the eighth day in Japanese. Neutralizing antibody had similarly lower titres, and persisted for a long time in most instances. The author believes a single observation of hemagglutination-inhibition titre above 1640 to be diagnostic; this was often present in patients in whom complement-fixing antibodies had not appeared. The reason for the consistently lower antibody titre in Japanese people remains unknown.

Mycobacteria and HeLa Cells.

C. H. SHEPHERD (*J. Exper. Med.*, January, 1957) has explored the growth characteristics of tubercle bacilli and certain other mycobacteria in HeLa cells. The HeLa cultures were broken up into cell suspensions and seeded on to coverslips. Growth was promoted in a medium containing 40% horse serum in balanced salt solution. Some horse sera were effective in promoting phagocytosis of added tubercle bacilli, and sera from individual horses were selected once they had been found effective. Cultures were incubated at 37° C. for up to five days. They were killed and fixed with formalin, dehydrated, and stained with carbol fuchsin, decolorized in 1% hydrochloric acid, and counterstained with Giemsa's stain. Cord formation occurred after five days, loops being formed around the nucleus; the appearance was characteristic of virulent strains. This can be seen when HeLa cells are inoculated with sediment from tuberculous sputum. Avirulent strains grew faster, and without cord formation. *Mycobacterium phlei* and *M. mageritensis* gave no evidence of intracellular growth, and *M. bovis* grew rapidly in three days without cord formation. The author considers that the appearances of mycobacteria in HeLa cells were sufficiently specific to justify the method as a test for differentiating strains.

Strains of BCG.

R. J. DUBOS AND C. H. PIERCE *et alii* (*Am. Rev. Tuberc.*, November, 1956) present a series of papers on the differential characteristics *in vitro* and *in vivo* of several substrains of BCG. The first paper concerns differences in culture on nitrite agar; the strains differed considerably in number and size of colonies according to the presence of different amounts of amino acids, protein hydrolysates, oleic acid and cholesterol in the medium. In the process of aging they lost the ability to grow on nitrite agar, some strains losing this ability faster than others. BCG strains vary widely in their ability to withstand absence of oxygen. There is some relationship between colony morphology and invasiveness *in vivo*. Further examination of 11 strains of BCG showed wide variation of colony on solid medium, from serpentine

growth similar to virulent strains down to heaped-up colonies like the avirulent strains. "Tween 80" added to the medium invariably led to the formation of smooth colonies, but different amounts were necessary amongst the strains. Cultures which had been made from mouse tissue tended to return to the spreading type of growth. The behaviour in animals of cultures of strains all the same age is described in the third paper. Intradermal inoculation showed strain differences by the size of the lesions produced. Intravenous inoculation showed strain differences by length of time before death. Mice subjected to metabolic strain and inadequate diet, thyroid supplement or synthetic diet showed the most severe reactions. The fourth paper records the immunizing effectiveness of the various strains. Two groups of mice were followed, one after intravenous inoculation, the other after intraperitoneal inoculation. If large doses of organisms are used, immediate response may prevent further multiplication, and the different substrains of organisms used leave no time to display inherent differences between strains. When small doses comparable with those used for human vaccination are given, there is a marked difference between strains. Those which are able to multiply *in vivo* provoke a more lasting immunity, although there is also an increased likelihood of glandular reaction in the human subjects. In the choice of BCG for preparation of a vaccine to use in man, the authors recognize the balance in the risk of accidents between a highly effective strain and a non-invasive but lower immunity-provoking strain.

Pollomyelitis Virus in Chimpanzees After Feeding.

D. BODIAN (*Am. J. Hyg.*, September, 1956) has followed the course of poliomyelitis virus in chimpanzee tissues after virus feeding in more detail than in his earlier experiments. The animals had no detectable antibody at the beginning of the experiments, and were fed either Wallingford or Mahoney strain of virus, five millilitres of a 10% saline suspension being given at a single feeding. This contained about 50,000 tissue culture infecting doses. The animals were housed separately, and specimens were collected over a period of ten days; they were then exsanguinated, and tissues were removed under the strictest conditions for virus isolation. In no animal was antibody detectable in the blood at the time of sacrifice. Tests for virus were carried out in monkey kidney tissue culture, and the virus was titrated if present in the suspension and typed by neutralization tests with hyperimmune monkey serum. No viruses were isolated which were not of the serotype inoculated. Virus was present in the throat for twenty-four hours after it had been given to the animals, disappeared, then reappeared in high titre up to the eighth day. It was present in deep cervical glands, Peyer's patches, faeces, ileum and colon in the previremic period; when viraemia had appeared, virus could be found occasionally in the liver and spleen and in the duodenal and jejunal wall. Histological examination of the central nervous system failed to reveal any

visible lesion. The author discusses the spread of virus and the absence of antibody in relation to the problem of central nervous system infection and the amount of virus present in the faeces. An addendum discusses recent interpretations of similar findings by Sabin.

Virus Associated with Infantile Croup.

R. M. CHANOCK (*J. Exper. Med.*, October, 1956) has studied the association of a new type of cytopathogenic myxovirus with infantile croup. The lack of evidence as to the aetiology of this common condition led to a trial of tissue culture techniques with throat swabbings from children with non-respiratory illness and from 12 children with croup. The swabs were immersed in five millilitres of Hanks's solution with added antibiotics, and cultivated in monkey kidney tissue in roller tubes. Two of the cultures yielded a cytopathogenic agent which agglutinated red cells, and antibody rise against these agents was demonstrated in paired samples of sera. In the early part of the study, sera from some infants in whom the cytopathogenic agent was not present showed a rise in H-1 titre; in the later months of the study this was not so. The cytopathogenic effect was a distinctive one with syncytium breaking away from the culture mass, vacuolation of the cells and a sponge-like appearance. Elford filtration suggested the size to be 90 to 135 millimicrons. Hemagglutinin was best at 4°C., elution at 37°C. Receptor-destroying enzyme removed the receptor site for this virus, now called CA, meaning "croup-associated". No antigenic relationship could be found by tests against influenza or Newcastle disease antisera. Infectivity of the virus was lost by either treatment overnight. The author discusses the relationship of these viruses to others in the respiratory group.

HYGIENE.

Preventive Medicine in Highway Safety.

R. McFARLAND (*Am. J. Pub. Health*, March, 1957) considers that "the pumber of accidents on our highways has attained the epidemic proportions of a non-contagious disease". An epidemiological approach to the problem is proposed. Accidents result from interaction of three factors: the host (worker or driver), the agent (or equipment), and the environment. The host is of primary medical concern, and the job to which a person is assigned should be related to his behaviour pattern and his psychological and physical characteristics. The influence of fatigue, emotional problems and alcohol on the reactions of a driver of a vehicle is stressed. Closer integration of the host-agent relationship through the application of the principles of human engineering can aid in the reduction of accidents. This involves a careful study of the equipment for faults in design that may lead to accidents. The host-environment relationship is concerned with the effect of physical variables on the individual. Illumination, temperature, humidity and carbon monoxide concentra-

tion in the air are examples of variables that affect the efficiency of the driver.

Engineering Aspects of the Disposal of Radioactive Wastes.

J. A. LIEBERMAN (*Am. J. Pub. Health*, March, 1957) discusses the disposal of radioactive wastes from the peace-time applications of nuclear energy operations. Because of the nature and characteristics of the radioactivity involved, its ability to damage human tissue, and its potential danger as an environmental contaminant, the safe handling and final disposal of nuclear energy wastes are integral and important aspects of nuclear energy operations. Two basic methods of disposal are at present used. In one, the material is concentrated and confined in a restricted area away from people and their resources. In the other, it is diluted and dispersed over a wide area. Here it is necessary to ensure that the safe capacity of the environment is not exceeded. So far, air-cleaning equipment has been developed to remove a wide range of contaminants. Rare gases such as argon (A^{41}), highly corrosive gases such as hydrogen fluoride, and particulate materials ranging in size from 0.05 to 20 microns have been removed from air contaminated by nuclear energy operations with removal efficiencies of more than 99.9%. The author considers that the handling and disposal of radioactive airborne wastes are within the capabilities of practical engineering. Disposal of solid radioactive wastes by burial in suitable burial grounds where a study of the geology and hydrology of the area has shown it to be favourable for such a purpose, by incineration to reduce volume and facilitate ultimate disposal, and by disposal at sea is discussed. Liquid wastes with low concentrations of radioactivity have been disposed of by normal methods without treatment or after minimum treatment if the dilution factors are sufficient to reduce the radioactivity to an insignificant amount. Disposal of highly radioactive liquid wastes has been difficult. Large quantities of liquid wastes have been stored in specially designed tanks, but there is a limit to the economical storage of liquid wastes. Ultimate disposal into the sea, fixation in inert material, discharge into selected geological formations such as spaces prepared by dissolution in salt beds, and separation of specific isotopes are discussed. The author concludes by stressing the important part of the public health profession in the development of the nuclear energy industry.

Pulmonary Tumours in Mice Exposed to Asbestos Dust.

K. M. LYNCH, F. A. McIVER AND J. R. CAIN (*Arch. Indust. Health*, March, 1957) exposed mice to dusty atmospheres containing asbestos floats. Primary lung tumours were demonstrated microscopically in 46% of the exposed mice and in 36% of the control animals. Multiple lung tumours were found in 18% of the exposed animals and in 8% of the control animals. No proof of malignancy was found in any of the tumours. The authors consider that their results do not support the conclusion of accumulating clinical evidence that asbestosis is associated with and therefore a possible cause of lung cancer in man.

British Medical Association News.

ANNUAL MEETING.

The annual meeting of the Tasmanian Branch of the British Medical Association was held at the Royal Society's rooms, Hobart, on March 16, 1957, Dr. A. ORMOND GREEN, the President, in the chair.

ANNUAL REPORT OF THE COUNCIL AND BALANCE SHEET.

The annual report of the Council, which had been circulated among the members, was adopted on the motion of Dr. A. O. Green, seconded by Dr. R. A. Lewis. The report is as follows:

Membership.

During 1956 membership has risen from 235 to 252.

Meetings.

The annual meeting of the Branch was held in the Royal Society rooms on Saturday, February 25, 1956. Thirty-nine members were present. At this meeting the result of the election of officers of the Branch for the year ending December 31, 1956, was announced. The annual report and balance sheet were taken as read and received. After the general business had been concluded, a minute of appreciation was passed to record, with appreciation, the past services to the Branch of Dr. B. Hiller and Dr. Franklin Fay. At the conclusion of the meeting the retiring President, Dr. W. K. McIntyre, gave an interesting address of the methods used to combat disease in the Macedonian Campaign, 1916-1917.

Reports of the Northern and Southern Divisions are attached.

Special Meeting of the Branch.

A special meeting of the Branch was held in Launceston on November 10 to discuss the raising of the annual subscription from £8 8s. to £12 12s. After the matter had been fully explained by the Treasurer, Dr. Franklin Fay, the motion was put to the meeting and passed unanimously. There being no further business, the meeting was closed.

Council.

Thirteen meetings of the Branch Council were held during the year. Two were held in Launceston and the other eleven in Hobart. The record of attendance was as follows:

Dr. A. O. Green ..	13	Dr. L. N. Gollan ..	9
Dr. L. H. Jones ..	12	Dr. R. A. Lewis ..	9
Dr. F. R. Fay ..	12	Dr. M. W. Fletcher ..	9
Dr. W. K. McIntyre ..	11	Dr. H. J. C. Engelsch ..	8
Dr. J. B. G. Muir ..	10	Dr. A. W. O. Young ..	7
Dr. L. H. Wilson ..	10	Dr. H. B. Gatenby ..	6
Dr. A. McL. Millar ..	10	Dr. K. J. Friend ..	2
Dr. R. J. Hudson ..	10	Dr. K. M. Kelly ..	1
Dr. A. J. M. Dobson ..	10	Dr. B. Hiller ..	1
Dr. R. Wall ..	9	Dr. P. Braithwaite ..	1

Dr. Friend, Dr. Kelly, Dr. Hiller and Dr. Braithwaite were members of the retiring Council and did not serve during 1956.

Representation.

The Branch was represented on the Federal Council by Dr. J. B. G. Muir and Dr. L. M. Gollan, both of whom have attended interstate meetings on behalf of the Branch. Their continued efforts on our behalf have been much appreciated and both these members have been reelected to represent us on the Federal Council for 1957.

Representation on Branch committees and other bodies during the year has been: Ethics Committee, Dr. R. A. Lewis, Dr. A. O. Green, Dr. R. Wall, Dr. A. Millar, Dr. J. B. G. Muir, Dr. F. R. Fay, Dr. L. N. Gollan; Road Safety Council of Tasmania, Dr. F. Phillips; Newsletter Committee, Dr. J. Dobson, Dr. L. H. Jones, Dr. A. W. O. Young; Publicity Committee, Dr. Gatenby, Dr. L. N. Gollan, Dr. F. R. Fay, Dr. J. B. G. Muir, Dr. A. Millar; Australasian Medical Publishing Company Limited, Dr. W. E. L. H. Crowther; Workers' Compensation Committee, Dr. A. Millar, Dr. A. O. Green, Dr. F. R. Fay, Dr. J. H. James, Dr. A. W. O. Young; Federal War Relief Fund (1914-1918), Dr. B. Hiller, Dr. R. Whishaw, Dr. F. W. Fay; Federal War Relief Fund (1939-1945), Dr. R. A. Godfrey-Smith, Dr. T. Giblin, Dr.

F. R. Fay; Rules Committee, Dr. J. Dobson, Dr. F. R. Fay, Dr. L. N. Gollan, Dr. A. Millar; Medical Fees Committee, Dr. L. N. Gollan, Dr. H. B. Gatenby, Dr. R. Hudson, Dr. J. B. G. Muir, Dr. F. R. Fay, Dr. T. C. Butler, Dr. L. H. Wilson; Tasmanian Post-Graduate Committee in Medicine, Dr. J. Dobson; Wages Board, Dr. P. Braithwaite, Dr. P. Dorney.

Matters Dealt with by the Council.

Matters of importance dealt with by the Council for 1956 are as follows:

A British Medical Association building has been considered on several occasions. A building in Barrack Street was inspected and considered as a possibility, but owing to its being sold at a rather higher price than it was thought to be worth, no further action was taken. A further proposal to join in with a group of specialists in building a block of professional suites, including a British Medical Association House, was considered, but owing to the high cost of building it was felt that no further action should be taken. It is now felt that the Branch should collect and save further money over the next few years, after which it will be in a more satisfactory position to undertake the building of British Medical Association House.

Early in the year it was decided by the Council that the Branch would undertake to run the Tenth Session of the Australasian Medical Congress. A Committee of Congress was formed with Dr. J. B. G. Muir as President and Dr. Franklin Fay as Secretary. Already much basic work has been done, and the various committees are getting down to the arduous task of working out the details. Owing to our small numbers in this State the success of this Congress will depend on the cooperation and help of every practitioner in Tasmania.

The question of fees in the National Health Scheme was discussed several times during the year, and Federal Council was advised that the Branch, while accepting the suggested fees of 10s. per surgery visit and 12s. per domiciliary visit, under protest, would press for 12s. and 15s. respectively, and it was considered that the new agreement should be for five years and not for an unspecified period as suggested.

Private and intermediate beds in public hospitals were discussed during the year, and the Council, while agreeing to this proposal in principle under certain conditions, has requested all members to refrain from approaching private members of Parliament on matters of British Medical Association policy, and that the Branch Council is the proper channel through which the matter should be viewed.

Early in the year we obtained a new schedule of fees for workers' compensation, the basis of which was a substantial increase, which was considered by the Council as satisfactory.

The question of medical schools and access to them by Tasmanian students has been investigated by the Council with rather disturbing results. Melbourne University students must attend a secondary school in Victoria and matriculate there. Sydney entrants are restricted to bona-fide residents of New South Wales. Adelaide and Tasmanian students are admitted only if vacancies remain in the quota after all eligible Western Australian students have been considered.

Owing to requests by several members, superannuation of self-employed persons has been investigated by the Council, and several schemes, including the Newcastle Doctors' Superannuation Scheme, have been considered, and a report in due course will be available in the Newsletter.

In reference to workers' compensation, a further legal opinion is to be obtained as to the legality of workers' compensation fees being paid to honoraries of public hospitals when these cases are actually treated by the honorary concerned. This decision was made after the Solicitor-General had given his opinion that honoraries are not entitled to receive workers' compensation fees.

Conclusion.

A huge volume of business has been dealt with by the Council during 1956, of which the above items form a very small part, and on the whole the Council feel that we have had a very satisfactory year.

A. J. M. DOBSON,
Honorary Medical Secretary.

FINANCIAL STATEMENT.

The financial statement for the year ended December 31, 1956, was adopted on the motion of Dr. F. R. Fay, the Honorary Treasurer, seconded by Dr. J. B. G. Muir.

REPORTS OF DIVISIONS.

Southern Subdivision Annual Report, Year Ended
December 31, 1956.

Meetings.

Ten monthly meetings were held and were well attended, the average attendance being 27. Nine meetings of the Executive were held. Attendances were as follows: Dr. Hudson 9, Dr. Dorney 7, Dr. Jones 6, Dr. Millingen 6, Dr. McArthur 6, Dr. Corney 5, Dr. Nolan 5.

Lecturettes were given at the monthly meetings as follows: Dr. Dorney, "Aspects of Cardiology in London"; Dr. Murray, "Salk Vaccine and Immunization"; Dr. Duncan, personal experiences of his trip to south-west Tasmania; Dr. Waterworth, "Recent Developments in Ophthalmology"; Dr. A. Millar, "Pains and Sprains"; Dr. Braithwaite, "Modern Trends in Cardiac Surgery". These were well received and aroused discussion.

Pensioner Medical Scheme.

During the year the Pensioner Medical Scheme was discussed at length on two occasions. The last one was on receipt of a letter from the Federal Minister for Health stating that no advance would be made in the rates of payment for the service. Although most members concerned expressed dissatisfaction with the present position, it was agreed to abide by the Federal Council and continue to work the scheme.

Salk Vaccine.

The campaign for immunization with Salk vaccine was carried out during the year by the Hobart City Council with the cooperation of members of the Southern Division. It received the whole-hearted support of members, and the City Council wrote in appreciation of their work.

Library.

The library has continued to function at the Royal Hobart Hospital. It is not being used as much as it should by members of the subdivision, especially as they pay an annual levy. A good assortment of new books has been added with the money from the levy and that provided by the Royal Hobart Hospital.

Week-End Roster.

The roster was discontinued during the year, as some general practitioners were dissatisfied with the support given it. However, we retain the Emergency Call Service, where messages may be received or left. It serves a useful purpose.

Headquarters for Tasmanian Branch, British Medical Association.

Although all members vocally support the establishment of headquarters for the Tasmanian Branch, the appeal for financial support did not succeed. The Tasmanian Branch has therefore adopted a different and firmer approach.

Nomination of Representative on the Hobart Hospital Board.

Dr. T. Giblin was elected our representative for two years.

Fluoridation of Water.

This was discussed at some length, and the Branch Council was advised of our qualified support for the scheme.

Fees in General Practice.

This brought a long discussion. It was decided to advise the Branch Council that a fee as guide for practitioners be set, and that it be raised from that last promulgated.

Superannuation Scheme.

During the last couple of months members have been discussing possibilities of various schemes promoted outside the State. The Branch Council has taken up the question and we await their opinion.

RODNEY J. HUDSON,
Honorary Secretary.

Northern Subdivision Annual Report, Year Ending
December 31, 1956.

Office-Bearers and Membership.

At the annual general meeting on February 2, 1956, the following office-bearers were elected: Chairman, Dr. H. J. C.

English; Vice-Chairman, Dr. H. M. Fisher; Honorary Secretary, Dr. H. B. Gatenby; Honorary Treasurer, Dr. D. B. Nathan; Members of the Executive Committee, Dr. L. N. Gollan, Dr. L. H. Wilson, Dr. K. Meagher. Dr. K. Meagher resigned in November, as he left the State (he was not replaced).

In December, 1956, the number of members enrolled was 110—an increase of seven members.

Meetings in General.

There were one annual general meeting, nine monthly general meetings and twelve Executive Committee meetings.

One general meeting was held at Latrobe, and the remainder at the Launceston General Hospital in the theatre, which was made available by the Board of Management, who also generously provided supper at each meeting.

At general meetings the average attendance was 25, a slight fall compared with previous years.

In addition to the above meetings, a medico-legal meeting was held on June 21, and the annual post-graduate week-end in November.

Clinical Pursuits.

Cases Demonstrated.—"An Unusual Case of Anuria", Dr. G. Vidor; "Vesico-Vaginal Fistula", Dr. L. H. Wilson; "Intermittent Porphyrin", Dr. I. Wood (Latrobe).

Addresses, Lectures et Cetera.—"Modern Concepts of Anaesthesia", Dr. J. Woodley; "Pollomyelitis Vaccine", Dr. H. M. L. Murray, supported by Dr. R. Wall; "An Interesting Application of Hypnotherapy", Dr. H. J. C. English; "A Visit to United States of America", Dr. W. W. Woodward; "Radiation Problems", Dr. H. Holden; "Costen's Syndrome", Dr. A. Gray (Latrobe meeting); "Tissue Injury", Dr. H. D. O'Brien (Latrobe meeting); "Aural Vertigo", Dr. D. A. T. Farrar; "Post-Graduate Experiences during an Extended Stay in Great Britain and Visits to United States of America and Austria", Dr. F. R. T. Stevens; "Experiences Whilst Abroad", Dr. R. J. D. Turnbull.

Annual Post-Graduate Week-End.

The thirtieth annual post-graduate week-end was held from November 9 to 11. This was unusually extensive, owing to the coincidental visit of Professor A. Clave, of Leeds (obstetrics and gynaecology). The visiting lecturers invited by the subdivision were Professor R. D. Wright and Dr. E. Rosanove, both of Melbourne.

Professor Wright lectured on "General Principles and Their Application to Water Metabolism", "General Principles in Electrolyte Practice", and "Developing Notions in the Organization of the Nervous System".

Dr. Rosanove lectured on "The 20 Common Skin Diseases", "A Session of Kodachromes (Skin)", and "Recent Advances in Dermatology".

The number attending the course was 56 on the first night.

The annual dinner, in conjunction with the week-end, was held at the Launceston Club and was a great success.

Medico-Legal Meeting.

At the medico-legal meeting on June 21 the guest lecturer was Mr. Justice Crisp, and the lecture was on "The Report of the Royal Commission on Capital Punishment". This was a most successful meeting and the attendance good.

Notable Matters of General Business.

1. A social fund was created early in the year and is financially healthy.
2. The question of hospital services on the North-West Coast came up, and a special committee of North-West Coast members met before our monthly general meeting in June. The matter was urgently handed over to the Branch Council. The critical state of affairs in Burnie was evident.
3. An increase in the capitation fee from 10s. per head per annum to 15s. was sought and obtained.
4. Pensioner Medical Service matters were not discussed so much this year as last, but we are now working the scheme under protest.

Latrobe Meeting.

The Latrobe meeting was held at the Devon Hospital, with clinical demonstrations and lectures in the afternoon;

BRITISH MEDICAL ASSOCIATION (TASMANIAN BRANCH).
Income and Expenditure Account for the Year Ended December 31, 1956.

INCOME				EXPENDITURE			
	£	s.	d.		£	s.	d.
To Secretarial Fees			312 0 0	By Members' Subscriptions			1,954 1 0
" Printing and Stationery			140 19 2	" Interest:			
" Postages			47 2 8	Commonwealth Bonds	47	1	8
" Code Address			3 3 0	Australasian Medical Publishing			
" Rental re Annual Meeting			1 5 0	Company Limited	30	3	4
" Travelling Expenses			248 15 0	" Dinner			77 5 0
" Capitation Fees:							88 5 0
Southern Division	66	0	0				
Northern Division	51	10	0				
Federal Council	298	15	0				
Australasian Medical Publishing							
Company Limited	235	0	0				
London: British Medical Associa-							
tion	409	7	9				
" Bank Charges			1,055 12 9				
" Sundry Expenses			4 11 7				
" Dinner			32 3 11				
" Annual Audit			83 5 0				
			5 5 0				
			1,929 3 1				
" Surplus for year ended December							
31, 1956			185 7 11				
			£2,114 11 0				£2,114 11 0

Balance Sheet as at December 31, 1956.

LIABILITIES.				ASSETS.			
	£	s.	d.		£	s.	d.
English, Scottish and Australian Bank,				Commonwealth Treasury Bonds, £1,360			1,327 5 6
Limited			31 10 0	War Savings Certificates			132 0 0
Capital Account:				Furniture			30 0 0
Balance	2,062	8	1	Australasian Medical Publishing Com-			
Plus:				pany Limited:			
Australasian Medical Pub-				Debentures	795	0	0
lishing Company Limited				Sydney	9	6	3
Surplus for year	185	7	11	Sundry Debtor—Australasian Medical			804 6 2
War Relief Contribution			2,248 1 0	Congress (British Medical Asso-			
Sundry Creditor—Southern Division:			2 11 0	ciation)			14 16 9
Library:							
Received	226	16	0				
Paid out	199	10	0				
			27 6 0				
			£2,309 8 0				£2,309 8 0

Headquarters Fund Account, December 31, 1956.

LIABILITIES.				ASSETS.			
	£	s.	d.		£	s.	d.
To Balance, January, 1956			234 3 9	By Balance, December 31, 1956			240 19 2
" Bank Interest			6 15 5				
			£240 19 2				£240 19 2

Audited and found correct, subject to our letter of March 8, 1957.

FRANKLIN R. FAY,
 Honorary Treasurer.

(Signed) ADAMS AND BENNETTO,
 Chartered Accountants (Aust.).

General Practitioners' Group: Statement of Receipts and Payments for the Year Ended December 31, 1956.

RECEIPTS.				PAYMENTS.			
	£	s.	d.		£	s.	d.
Balance, January 1, 1956	121	15	8	Macquarie Typing Service			17 18 4
Subscriptions	16	16	3	Trans-Australia Airlines			68 16 9
Subscriptions for Course	50	8	0	Wrest Point Dinner			110 15 0
Subscriptions for Dinner	108	13	9	Balance Carried Forward			100 5 7
Bank Interest			1 3				
			£297 14 11				£297 14 11

ATHOL D. CORNET,
 Honorary Treasurer.

30 members were present. An informal dinner was held in Devonport the same evening. The attendance at the meeting was appreciably less than the previous two years.

Branch Council.

The Northern Subdivision was entitled to appoint three councillors for 1956, as our numbers had passed the hundred mark.

Subcommittee Representatives.

Obstetrical and Gynaecological Section.—During the year six meetings of the section were held and were quite well attended. At each meeting an address was given by a member of the section, and on each occasion an interesting and informative discussion followed. As was mentioned in last year's report, it is a pity that members of the resident medical staff at the Launceston General Hospital do not avail themselves of the opportunity to attend these clinical meetings.

St. Luke's Hospital.—No meetings were held (Dr. Gollan).

Northern Ambulance Board.—No meetings were held (Dr. Spence).

H. B. GATENBY,
Honorary Secretary.

REPORT OF ROAD SAFETY SUBCOMMITTEE, YEAR ENDING DECEMBER 31, 1956.

The Road Safety Council of Tasmania has no authority, no administrative or executive powers; it can only make recommendations. It amounts to little more than a discussion group. Its membership is derived mainly from the numerous branches of the motoring trade.

Meetings are held regularly every quarter, and subjects for discussion range widely. Recently the compulsory inspection of motor vehicles has received much attention.

Most of the matters recently considered are not of medical interest, the exception being drunken drivers. Opinion is in favour of heavier penalties. These would increase the need for a precise standard by which drunkenness could be judged. The estimation of the alcohol content in the blood provides the required standard.

ELECTION OF AUDITORS.

Messrs. Adams and Bennetto were reelected auditors for 1956.

AMENDMENT OF RULES.

Dr. Franklin R. Fay moved the following motion, of which requisite notice had been given:

That Rule 74 (viii) be amended by deleting the second last word "four" and inserting the word "two".

That Rule 46 be amended as follows: 46 (a) line 5—omit the word "next", 46 (c) delete the second word "election" and in its place insert "ballot".

That Rule 5 be amended by inserting the word "fifteen" in place of "ten" in the first line of paragraph (b).

The motion was carried.

ELECTION OF OFFICERS.

The President announced that the following had been elected officers of the Branch for the year 1957:

President-Elect: Dr. A. McL. Millar.

Vice-President: Dr. R. A. Lewis.

Honorary Treasurer: Dr. Franklin R. Fay.

Honorary Medical Secretary: Dr. K. M. Kelly.

Branch Councillors: Dr. R. Wall, Dr. L. H. Wilson, Dr. H. M. Fisher, Dr. A. J. M. Dobson, Dr. P. L. Dorney, Dr. K. J. Friend.

A vote of thanks was accorded Dr. A. J. M. Dobson, who relinquished the office of Honorary Medical Secretary.

ALIEN DOCTORS.

A discussion took place on the matter of alien doctors. It was decided that the incoming President should approach the health department, to ascertain whether an attempt had been made to meet requirements from Great Britain.

INDUCTION OF PRESIDENT.

Dr. A. O. Green then introduced the incoming President, Dr. M. W. Fletcher, and vacated the chair in his favour.

RETIRING PRESIDENT'S ADDRESS.

Dr. A. O. Green then delivered his president's address, entitled "Medicine and the State: Retrospect and Aspect".

Dr. Green said that as an ever-increasing amount of time and attention had to be given by the Association at the present time to matters of State as they affected the practice of medicine, it was perhaps fitting that a brief historical review be made of the relation of the State to medicine. That relation of the State to medicine had two aspects—that of hygiene and preventive medicine, and that of the nursing and treatment of the sick. The development of those two aspects had been far from uniform, and at times one or another of them had been entirely neglected, especially those matters of a public health nature. If the ancient Egyptian civilization was taken as the starting point, one found that in papyrus there were records of matters of sanitation that were far superior to those of the European Middle Ages. Ancient Egypt was a densely populated area with a high degree of civic organization, and in such circumstances laws of a public health nature tended to be conceived and could be enforced.

When ancient Jewish medicine was considered, one found that it excelled in dealing with epidemics. The Jewish priests, who were really the governing body of the people, acted as medical officers of health, and remarkably efficient officers they appeared to have been. Whereas the Greeks at a much later age seemed to have taken very little notice of the direct transmission of disease from one individual to another, the Jewish priests were keenly aware of it, and took whatever steps were possible to guard against it. The book of Leviticus laid down clear and efficient instructions on such subjects as proper and improper food, clean and unclean objects, the hygiene of childbirth and the prevention of contagion. Pigs transmitted such parasites as *Cysticercus* and tapeworm to human beings, and it was a wise precaution to forbid the eating of pork. References were made in Leviticus to the diagnosis of gonorrhoea, leucorrhoea and leprosy, and in each case special emphasis was placed on the need for preventive measures. So efficient were the Bible's instructions for the handling of the leprosy problem that, when that disease started spreading through Europe during the Middle Ages, the preventive methods were those recommended in the Old Testament. It might be said that the sole contributions made by the Jews to medicine were in the fields of hygiene and preventive medicine.

Dr. Green went on to say that in ancient Greece, with the advent of Hippocratic medicine, attention was paid to the diagnosis and treatment of the sick person. Although the temples were probably still the place of treatment, there was no attempt at comprehensive organization of medical services, and matters of public health were probably entirely neglected. During the great days of the Roman Empire, the only medical advances made by the Romans themselves were in public health and in the organization of the medical services of the army, and in both these spheres the Romans showed great enterprise. They must be credited with having introduced extremely useful sanitary measures by the issuing of government decrees. One proclamation made in 450 B.C. forbade all burials within the city walls, and another ordered city officials to attend both to the cleanliness of the streets and to the water supply available to Roman citizens. The Romans paid great attention to the drainage, sanitation and water supply of their cities, and Rome possessed its *cloaca* or subterranean drains as early as the sixth century before Christ, in the age of the Tarquins. Dr. Green said that the *Cloaca Maxima* or main storm-water drain, in use in Rome at the present time, actually dated back to that time. Rome also possessed a magnificent water supply, and regulations enforced the cleanliness of its streets. Another notable thing in Roman days was the institution of a public medical service of physicians, which was to look after the needs of poor Roman citizens; but it was in its army medical services that Roman efficiency was most apparent. It was to the Romans that the origin of the hospital system was owed. The first Roman hospital might have well been built, as legend proclaimed, by the action of the civic authorities; but the spread of such institutions throughout Europe had been brought about chiefly through the army. As the frontiers of the Roman Empire were pushed further and further away from Rome, great military hospitals were erected at various strategic points along the lines of com-

munication, and many remains of them were still to be found. At a later date *valetudinaria*, or infirmaries for poor sick civilians, had been opened in Rome by the civic authorities. The contribution of Rome to medicine therefore might be said to be not in the form of diagnosis or treatment, but in respect of public health services and hospital organization.

Dr. Green then said that in the European Middle Ages the Church of Rome was the Church Universal, and as the temporal kings and princes were mostly taken up with squabbles and wars, it was the Church which organized much of the civic life. The Church, to a large extent, acted as a civil administrative organization, and, of course, the Church was a very extensive land owner. Unfortunately, public health measures initiated by the Romans were to a large measure forgotten, and public health was at a very low ebb; but some rules of hygiene were enacted in some ecclesiastical houses. That indicated that the principles of hygiene were not entirely forgotten. The rule of Barnwell Priory near Cambridge stated that: "The dishes are not to be broken, or dirtied or smeared on the underneath. The brethren ought all to be careful not to wipe their noses or rub their teeth on the napkins or tablecloths." Present-day schools, universities and charitable foundations had, all grown out of ecclesiastical rules and ordered life; the names of officers still survived in societies and collegiate bodies—for example, the bursar of the finances, the infirmer of the hospital and the almoner of the charities. In the infirmaries, bath houses were provided for the sick and aged. Although in medieval Europe the public health methods of the Romans were to a large extent forgotten, the Church of the time made further advances in the matter of hospitals. The Church founded many of the great hospitals still in existence in Europe. The *Hôtel-Dieu* in Paris was founded by a monkish order in the tenth century and St. Bartholomew's Hospital in London was founded in 1123 by a monk called Rahere. St. Thomas's Hospital was founded in the year 1200. It was not till the eighteenth century that other great London hospitals, such as Westminster Hospital, Guy's Hospital and the London Hospital, were founded. It was in the Middle Ages that the practice of quarantine had been brought into use. The word quarantine itself was a relic of the sanitary measures adopted at that time by the small republic of Ragusa on the eastern shores of the Adriatic. The civil authorities of that tiny State issued certain regulations which were very successful in halting the spread of the Black Death. Ragusa was a small State with a large maritime trade, and to prevent the introduction of the Black Death a landing stage was built at a considerable distance from the city and the usual harbour, and all immigrants were ordered to land there. They were detained in that spot outside the city for a period of forty days. From the Italian words for that period of forty days' isolation, *quarenta giorni*, had been derived the modern term "quarantine".

Dr. Green then referred to the practice by royalty of "touching" for certain diseases. He said that that method was applicable only to two diseases—epilepsy and the King's Evil, otherwise known as scrofula or tuberculous swelling of the glands of the neck. That practice, which was supposed to have been founded by Edward the Confessor, had been carried on from time to time by his successors right up to the time of Queen Anne. Each patient admitted to the royal presence was presented with a small gold token or touchstone, whether he was benefited or not. King William III had very little faith in his powers as a miraculous healer, and when he was persuaded to try his hand at healing he was reputed to have murmured over the applicant's head the words: "God grant you better health and more sense." Queen Anne, however, encouraged scrofulous patients to come to her palace, and amongst those whom she touched was Samuel Johnson, a scrofulous infant two years old. After Queen Anne's death, the ceremony of the royal touch fell into disuse. Leprosy became a great trouble in the Middle Ages. In earlier times the disfiguring disease of leprosy had existed only in the East; but during the earlier centuries of the Christian era it crept slowly along the Mediterranean coast and then made its way northwards. Everybody appreciated the fact that it was spread by contact, and in consequence of that knowledge the leper was banished from all human society and even declared to be legally dead. He was excluded from taking part in church services, and all he was allowed to do if he was a devout Christian was to peep in at the celebration of the Mass through a leper's window of the church. Cruel though those regulations were, they began to take effect, and in course of time they were so successful that leprosy to all intents and purposes disappeared from Europe. But hygiene

in Europe in medieval days was at a very low ebb. The people in those days possessed no drains and no water supply, the houses were ill-ventilated and filthy, and the streets were narrow and foul-smelling.

In the later days of the Renaissance, apart from rapid advances made in the basic medical sciences, legislation was introduced directed to the suppression of charlatan practitioners and to the licensing of properly trained physicians and surgeons. Thomas Linacre was a classical scholar and a well-qualified medical man, who was a private tutor to the children of Henry VII, and he became the King's confidant. He was a man of great influence in the times of Henry VIII, and noted with alarm the number of ill-equipped men, often of very doubtful character, who were practising medicine—illiterate monks, apothecaries, quack doctors from both home and abroad. All those men were doing untold harm to the public, and at the same time were bringing medicine into disrepute. Linacre managed to obtain from Henry VIII letters patent for the establishment of a corps of acknowledged medical men, a carefully picked medical body, which later became the Royal College of Physicians of London. That College was empowered by Royal Charter to examine and license physicians, and to decide who should be allowed to practise medicine in the City of London and its neighbourhood and who should not. Thomas Linacre became the first President of the Royal College of Physicians, and no better man could have been chosen for that position. About that time an anatomy Act was passed in Great Britain, which gave the barber surgeons of London the right to dissect the bodies of four executed criminals every year, and it was Henry VIII who granted the Charter to the Guild of Barber Surgeons. It was in Tudor days that the first poor laws were enacted. The real starting point was in an Act of 1536, which imposed on the several parishes the duty of relieving their own destitute poor. That Act was further elaborated in 1601, at the end of Queen Elizabeth's reign. Under that Act the authority of the local justice and the machinery of the parish now began to take the place in the life of the people which the lord of the manor and the manorial court had previously occupied. Up to that time charity had been largely a voluntary matter; but in 1555 it was enacted that any parishioner who refused to make a suitable contribution would be gently exhorted by the parson and the church wardens, and if he was obstinate he would be sent for by the bishop and talked to. In 1563 it was recognized that even the eloquence of the bishop might fail, and so provision was made that an obstinate person should be summoned before the justices or mayors in towns, who should lay an assessment on him. Finally, in 1572, the justices were empowered to make a direct assessment, and to appoint overseers of the poor to take charge of the whole business. In that provision lay the germ of social service taxation for the care of the sick poor.

Dr. Green went on to say that it was during the Renaissance years that the new disease syphilis was introduced to Europe. At first it was assumed that its spread was by air contagion, the sexual nature of its origin being unsuspected. In Paris in 1497 an Act was passed to the effect that all persons suffering from it were forbidden under pain of death from conversing with the rest of the world. Parisians who had already contracted syphilis were isolated from their fellow citizens in the suburb of St. Germain. Visitors to Paris from other countries who were infected were ordered to leave the city within twenty-four hours, four sous being given them to return them to their native land. The Scots appear to have suspected earlier than any other nation that syphilis was transmitted by sexual contact. The Town Council of Aberdeen enacted "that for the protection from the disease which has come out of France in strange parts all light women must desist their vice and sin of venery and work for their support on pain else of being branded with a hot iron on their cheek and banished from the town". Brutal though that Act was, it showed a better understanding of the nature of the disease and the measures required for its prevention than did the judicial decrees issued in France.

In the eighteenth century, public health services in England had improved practically not at all since the Middle Ages; but about that time London, Birmingham and Manchester all obtained their Improving Acts, in consequence of which streams were covered in, the streets were paved and lighted and sewers were laid down. Yet in most towns a continuous water supply to the inhabitants was still unavailable, and even in the great city of London householders had water for only an hour or two three times a week. Moreover, as the mains and sewers ran close together and were sometimes broken, the water supply

might easily become contaminated. At late as 1831, London suffered a bad epidemic of cholera, which was traced to a communal pump in the neighbourhood of Broad Street. The improvement of public hygiene was largely due to the influence of Jeremy Bentham, who lived from 1748 to 1832. He was a philosopher rather than a scientist, and he saw that health was an essential requirement for the happiness of many. That being the case, Bentham set forth fearlessly to demolish everything which stood in the way of its attainment. Edwin Chadwick was amongst Bentham's disciples, and was to be the means by which some of Bentham's schemes were to be implemented. Chadwick was precisely the type of man needed to push sanitary reforms through Parliament against the active resistance and, what was far more difficult to overcome, the leaden lethargy of a government which was not in the least interested in preventive medicine. The passing of a *Poor Law Act* in 1834 provided Chadwick with his first opportunity of applying pressure—an opportunity which he was not slow to take. Chadwick was made chairman of a select committee which got together and made three recommendations—the passing of a *Building and Sewerage Act*, the setting up of local health boards and the appointment of a number of sanitary inspectors. In 1848 the *Public Health Act* was passed; that legislative measure could be regarded as the first of many subsequent preventive measures to be adopted in England. Also in 1832 an *Anatomy Act* was passed. That Act had been devised by Dr. Southwood Smith in order to make bodies available to medical students for dissection, and it was characteristic of the practical philosopher Bentham that he should have inserted in his will a special clause to the effect that his body should be dissected "so that mankind may reap some small benefit from my decease". His request was duly carried out, and his skeleton, dressed in the clothes he wore in life, still stands in the Medical Museum of University College Hospital. The *Commonwealth Act* of 1876 could be looked upon as being a date which was as important in the history of sanitary reform as the signing of Magna Charta in the history of constitutional reform. The passing of that Act marked a change-over from the purely negative act of getting rid of public nuisances to a positive policy of doing everything possible to raise the general level of health. In 1840 people saw no reason why a man should have anything for which he could not pay; at the present time it was held to be morally wrong to withhold from a poor man any essential medical treatment which a rich man could buy. Since 1855, the vast majority of male workers in England had been voters, and since 1900 the wage-earner had been the power in the land. Throughout the twentieth century his political influence had caused the State to set up systems of medical services, paid for partly by the worker, partly by the employer and partly by the State—in other words, by everyone. It was not till as late as 1907 that the school medical services were introduced into England. At that time the teaching of hygiene to children in schools was introduced, and the influence of the school teacher was a factor in improving standards of dietary and living in the younger members of the population. Such teaching might not have been highly scientific, but it was very practical and represented a great advance on the abysmal ignorance in which children had formerly been left.

Dr. Green then reverted to the middle of the nineteenth century, and discussed the powerful influence of Florence Nightingale on legislation in regard to the health and to civil hospitals. He said that after the Crimea, Miss Nightingale had put before Queen Victoria and the Prince Consort all the defects of the then present military hospital system and the reforms that were needed. That culminated in her pamphlet entitled "Notes on Matters Affecting the Health, Efficiency and Hospital Services of the British Army". Her evidence, which was read at a special commission to examine Crimean events, contained the material which was to prove of vital importance to the British soldier for ages to come. She produced evidence that the mortality of British soldiers in barracks was almost double that of the civilian population, her cry being: "Our soldiers enlist to death in the barracks." No government could afford to ignore that challenge. Her plans were to put the barracks in sanitary order, found a statistical department for the army and institute an army medical school. After her great success in improvement of army medical services, the Government asked her to look into the condition of civil hospitals. There she found a high mortality and administration worse than that of the army hospitals. Miss Nightingale had visited all major hospitals throughout England and the Continent as far as Sardinia. Her notes on hospitals published in 1859 were a great success, and she was constantly asked to advise on hospital construction.

Previous to that, nobody had worried much how hospitals were constructed. Her suggestions were adopted in the planning of Birkenhead Hospital, Edinburgh Infirmary and Coventry Hospital, and of infirmaries at Leeds, Staffordshire and Swansea. Most important of all was the advice she gave in the reconstruction of the new St. Thomas's Hospital at Lambeth, the present site, as the old site had to give way to the ever-expanding railway system of England. She advised the Crown Princess of Russia and the Queen of Holland on hospital planning, and designed a hospital at Lisbon at the request of the King of Portugal. She dealt with all the details of hospital planning—kitchens, laundries, baths, sinks, taps, basins, and also the piping of water, which was then a novel idea. Included in her plans were chutes for soiled linen, recreation rooms and the advocacy of pale pink for walls instead of the then popular dark green colour. Hospital statistical forms were drafted in 1859 by Miss Nightingale and were well received. Previous to that, hospitals used their own method of naming and classifying diseases. She established a training school for nurses at St. Thomas's Hospital in 1859, in opposition to the medical profession. For a while she opposed certification of nurses by examination, as she held that no examination could adequately ascertain the character and personal qualities which she considered so essential to nursing. Miss Nightingale had also initiated great reform in regard to hygiene and nursing in workhouse infirmaries. She changed the character of nursing by careful selection of applicants for nursing, and by exercising close personal and friendly vigilance over her young ladies. One other important innovation attributable to Miss Nightingale was the institution of district nursing in the form of the Metropolitan Nursing Association in 1876.

Coming to the present century, Dr. Green said that he proposed to outline the rapidly developing influence and control that the State exercised over public health and medical practice. The British *National Health Act* of 1911 was the first of a series of Acts which culminated in the British *National Health Service* of 1946. Those Acts were all well intentioned, but they left much to be desired from the point of view of patient and practitioner. Though specialist services had been facilitated, the great burden thrust on general practitioners was reflected in the number of medical men who were seeking to quit the Old Country and its *National Health Service*. It was to be regretted that the medical profession in Great Britain did not speak with one voice, as there was a very large minority of practitioners who did not belong to the British Medical Association. Anyone reading the supplement to the *British Medical Journal* could not but be struck by the unsatisfactory features of the British *National Health Service*, especially as it affected the general practitioner. Australia prided itself on a standard of general medical practice probably second to none in the English-speaking world, and Dr. Green thought that that was widely acknowledged. Similarly, the Australian public health services and social services were more satisfactory than those in Great Britain. In 1910 the Commonwealth Government had introduced the *Invalid Pensions Act*. The *Pharmaceutical Benefits Act* had been introduced in 1947; it relieved patients of the ever-mounting costs of modern pharmaceuticals, and all patients could have prescribed for them the necessary costly drugs at no direct expense to themselves. The Pensioner Medical Service had been introduced in 1951, allowing free treatment to all pensioners, and in 1953 the *Medical and Hospital Benefits Act* had been introduced; it represented in fact State subsidization of all medical and hospital services.

Finally, referring to Tasmania, Dr. Green said that they had reason to be proud of the record of State medicine there. From 1939 the State had provided free prophylactic inoculations for diphtheria, later for pertussis and tetanus, and quite recently for poliomyelitis. The Tasmanian State Department of Health had led the way in regard to compulsory X-ray examination as a means of detecting tuberculosis in its early and treatable stage; that was in the year 1952. The Tasmanian Branch had wholeheartedly supported these measures, which had been more than justified by the results. The Branch had been consulted many times by the State Department of Health in regard to projected legislation, and though its recommendations were not always adopted, and though members considered that the Branch's advice was not always sought when it should be, the fact was that the Branch and the legislature were in general working harmoniously together to improve medical services to the public in Tasmania. No form of health legislation when first introduced was likely to be perfect, and amendments through oversight or changing conditions were bound to be needed. It was the responsibility of the medical pro-

fession as a body to keep abreast of the trend in medico-political spheres, and to be prepared to give voice to carefully considered opinions, which would inform and guide the government of the day in maintaining the health of the people and the standard of medical practice which it valued so much.

One aspect of medicine in the State should not be overlooked by the medical profession—the matter of medical research. Research had two phases, clinical research and laboratory. Those two phases were intimately related, and one could not bear fruit without the aid of the other. Every doctor was of necessity a research worker in his daily practice, and the more medical men undertook their duties in the spirit of research, the more scientific and effective they became. The scientific battle against cancer and coronary disease was progressing all too slowly for want of monetary aid from the State. But, money was not the only requirement in that fight. Young graduates must be encouraged and selected and trained to undertake that research, and they must be adequately paid. Dr. Green specially mentioned the need for research in the Cinderella of medical sciences—psychiatry. He said that the commonest of all disorders in the land were psychiatric. In Britain at the present time, well over 40% of all hospital beds were in mental hospitals, and psychiatric disorders or organic disorders with psychiatric aspects constituted probably about 20% to 30% of cases seen in general practice. Therapeutic psychiatry had made remarkable strides in the past twenty years and was probably on the threshold of a still more rapidly widening field. Little or no money was granted for such research. At that point it was opportune to turn to the preventive aspects of psychiatric medicine. Psychiatric disorders were due to an inherent tendency in certain individuals plus environmental factors. It was those latter factors which in many cases were preventable. Magistrates and social workers allied to juvenile courts repeatedly emphasized that a lack of careful upbringing or erroneous upbringing resulted in vandalism, delinquency and crime—all of which were evidence of warped personalities. The obvious public health measures required to prevent such disasters in young folk should include reformation of home life and censoring of literature, films and the radio. Leaders in education were alarmed about the evil possibilities of television; but this was the only potential influence that the authorities hoped to control. At present radioplays and films and literature, both comics and that classed as good literature, predominantly portrayed the abnormal in man's nature—violence and sexual error; adolescents were apt to take those as the norm of conduct. No wonder that there was concern in many quarters about the future generation. There was a great opportunity for immediate fruitful research and public health measures, to protect and guide the developing personality of the young generation. That was surely among the most pressing needs of the day.

Dr. Green, in conclusion, urged the members of the medical profession to make sure that they did not concern themselves entirely with the material, and to bear in mind that "*mens sana in corpore sano*" should be their ultimate hope and practical objective.

Medical Societies.

PÆDIATRIC SOCIETY OF VICTORIA.

A MEETING of the Pediatric Society of Victoria was held at the Royal Children's Hospital, Carlton, on November 14, 1956. This was the H. Douglas Stephens Memorial Meeting.

Wilms's Tumour.

DR. R. HOWARD read a paper on Wilms's tumour. This was published in the issue of February 16, 1957, at page 200.

DR. R. KAYE SCOTT, in opening the discussion, said that Wilms's tumours occurred most commonly in very young children, most often around the age of two years. The tumours in the great majority of cases originated at or before the time of birth, as the active development of the nephron structure of the kidney continued until just after birth. The tumour rarely might originate outside the kidney, but generally was found within the renal capsule, which became expanded over the growing tumour. Tumour growth was massive, and large neoplasms were formed extending downwards and forwards into the abdomen. The

tumour parenchyma was renal blastoma. This had the capacity for differentiating first into renal tissue, and sheets of undifferentiated epithelial cells, solid columns or tubules or imperfect glomeruli might be recognized. Alternatively, differentiation might occur into any variety of connective tissue, including cartilage and bone, or smooth or striated muscle. Dr. Kaye Scott said that Wilms's tumours were by general consent classed among the highly radiosensitive neoplasms. However, all his experience in treating post-operative residues or recurrences or inoperable tumours would contradict that assertion.

It was obvious that the various tissues comprising the tumour must possess different degrees of radiosensitivity according to the direction of differentiations followed. In general cartilage, bone and muscular tissues would have very little radiosensitivity, the primitive connective tissues might show some response, undifferentiated epithelial masses could be quite sensitive, and differentiated tubules and glomerular structures again would be less radiosensitive. As the tumours were varied greatly in make-up from one to another, there would be corresponding variation in response to irradiation.

Dr. Kaye Scott went on to say that the tumours grew by expansion *in situ*, and the fact that huge masses were so commonly formed indicated that in the majority of cases blood dissemination by venous invasion must be late. Secondary deposits in lymphatic glands were not uncommon, and again were a late form of spread. Direct extension into adjacent tissue planes was usually also a late manifestation. It was to be expected in large tumours and was a complication which would make removal impossible and local recurrence inevitable. Such local recurrences were found in a large proportion of the post-operative patients who had come into his hands for radiation treatment. Frankly, he had found such isolated abdominal nodular recurrences generally resistant to irradiation, and the cases progressed to a fatal termination. He had attempted every known technique of irradiation, from high dose in short time methods to prolonged irradiation techniques, the latter designed to control resistant tumours of mesenchymal type; but a useful result had rarely been attained. Therefore the radiotherapist was depressed about the results of post-operative X-ray therapy in Wilms's tumours.

Dr. Kaye Scott then said that any tissue possessed radiosensitivity in relation to its generic type, and tissues which normally were undergoing replacement mitosis like skin were more sensitive than tissue like muscle, in which replacement mitoses were rare. That was called "tissue sensitivity". Further, a cell in mitosis was more sensitive than a resting cell. The third type of sensitivity depended on the age of tissues and was called "developmental sensitivity". Embryonic tissues were more sensitive than the tissues of a child, which were more sensitive than the tissues of an adult.

Problems of administering radiation to a wide tissue volume of an infant included the risks of late delayed growth effects on normal tissues. Dosage of the order of 3000r would certainly cause late growth defects and deformity if administered to an infant, and dosage of less than that amount was likely to be ineffective for tumour destruction and control. If radiation therapy was given by prolonged techniques, which were more effective in controlling resistant mesenchymal tumour elements, then the effect on normal, slowly growing tissues like cartilage and connective tissue was the greater. The damage resulting from the usual high-dosage post-operative techniques was rarely seen, as the children often succumbed to their disease. Dr. Kaye Scott said that the variability in tumour response had been pointed out; so for these two reasons irradiation alone was not a satisfactory method of treatment. The radiotherapist's impression was that the sequence of operation and post-operative X-radiation therapy was failing to cure those tumours. Perhaps some of the patients with early smaller tumours were not submitted for radiation treatment, and they might still survive. Dr. Kaye Scott said that if a small tumour was regarded as cleanly excised, he would not want to give radiation therapy post-operatively in the amount which would be necessary for probable tumour control, as late growth defects would be inevitable. Therefore in an early tumour, the clear-cut indication for the method of treatment would be operation alone, with surgical techniques designed to stop dissemination of the tumour by ligation of the renal pedicle as the first operative step.

Dr. Kaye Scott went on to say that it has been stated that exploration was needed in many another case to determine the nature of the upper abdominal tumour. The com-

mon differential diagnosis lay between adrenal neuroblastoma, Wilms's renal tumour and hydronephrosis. Less common entities were polycystic kidney and retroperitoneal sarcoma. The delay of the extra few days to allow radiological investigation would be well justified, and intravenous and retrograde pyelography would provide the diagnosis in the great majority of cases of large tumours. It was in those large tumours that extension into surrounding tissue planes might make removal difficult and recurrence the rule. If a diagnosis of Wilms's tumour could be established before operation in such a case, then pre-operative irradiation would seem to be the logical next step. If the tumour was partially sensitive, a significant reduction would follow a moderate dosage—dosage of the order which would not be likely to cause inevitable late growth defects. A smaller tumour should be easier of removal, provided time had been given for the reactionary effects to settle. If the tumour was not immediately responding, operation might be proceeded with; but under such circumstances the condition was likely to be inoperable, and no useful result would be obtained. Dr. Kaye Scott thought that only two patients had come for pre-operative irradiation from the Royal Children's Hospital to him at the Royal Melbourne Hospital during his term as radiotherapist. Both were sent because they were regarded as practically inoperable, and in neither case was a useful result obtained. It was worth remembering that the irradiation could be given from posterior and lateral fields, the anterior field being left unirradiated in case immediate surgical attack became necessary.

Dr. Kaye Scott said that malignant disease in childhood was assuming greater importance as other common causes of death in infancy were being eliminated. It was said that more children now died of malignant disease than of all the infectious diseases combined, including poliomyelitis. Only the early recognition of those cases could provide better results than were being obtained at present. It was difficult to see how earlier diagnosis could be attained when Wilms's tumour could grow to such large size before being obvious to the parent.

Dr. D. STEPHENS wondered what was the explanation for the difference in successful results between those of Gross and those obtained in Melbourne. Could it be the difference in time between diagnosis and operation, or did the radiotherapy regime differ in Melbourne?

Dr. Kaye Scott said that the radiotherapy regime in Melbourne was for all practical purposes the same.

Dr. M. CLARKES pointed out that the tumour as it grew often appeared to be an intraabdominal mass and was mistaken for a spleen. He also said that cysts occurring in and around the kidney might be mistaken for tumours.

Dr. A. R. WAKEFIELD asked Dr. Kaye Scott whether high-voltage therapy was going to be able to deliver optimum dosage with less damage.

Dr. Kaye Scott said that he doubted whether that would be so. One might get a better dose into the centre of the pelvis, where present doses were obstructed by bone. By ordinary methods bone absorbed two and a half times more radiation than soft tissue. When one used high-voltage radiation, all tissues were the same and there was no filtration by bone. One could penetrate the tumour, but the tolerance of blood and bowel had to be watched. There were really no problems in getting the dose in. When one was attacking a slowly growing neoplasm, it had to be remembered that the rate of growth was the same as that of ordinary tissues. Dr. Kaye Scott did not think the linear accelerator was going to make any difference.

Dr. H. SINN asked whether in Gross's cases there had been a large proportion of patients aged under twelve months, because Dr. Howard had remarked earlier that those cases had a better prognosis.

Dr. Howard said that Gross did not have a higher proportion of patients in that age group, and that was not the answer to the difference in mortality.

Dr. H. WILLIAMS asked Dr. Kaye Scott whether there was any experimental evidence that chemical or endocrine therapy was likely to have any effect on Wilms's tumour.

Dr. Kaye Scott said that there was no evidence that endocrine therapy had any effect. With regard to chemotherapy, the mustard group had been found to have some transient effect in neuroblastoma, but no good effects had been found in Wilms's tumour.

Dr. J. WILLIAMS asked whether there was any real statistical difference in the figures of different workers.

Dr. Howard said that there was actually no statistical significance at all in the variations.

Primary Peritonitis.

Dr. R. FOWLER, JUNIOR, presented a paper on primary peritonitis. This paper has been published in full in *The Australian and New Zealand Journal of Surgery* of February, 1957, and only a short summary is included here.

Dr. Fowler presented an analysis of 97 known cases of primary peritonitis which had occurred at the Royal Children's Hospital, Melbourne, during the past thirty years. He found that the evidence from that local experience contradicted the prevailing notion that surgery was of any value in the treatment of primary peritonitis, but gave full credit to the introduction of antibiotics for the abrupt fall in its mortality and post-operative morbidity during the past decade.

On the basis of that experience, Dr. Fowler put forward a plan for the management of primary peritonitis, first, in previously normal patients for whom diagnostic laparotomy was a necessary procedure, and secondly, in patients with preexisting ascites for whom non-operative treatment was advised. He said that in the latter group of patients fluid should be obtained by abdominal paracentesis to confirm the diagnosis by smear and culture methods. If examination of the smear revealed obviously fecal flora, then diagnostic laparotomy should be undertaken. However, if pneumococcal or streptococcal peritonitis was indicated by the smear, then antibiotics should be given, and only in relation to those patients who did not improve after a reasonable trial of such drugs would the question of diagnostic laparotomy arise again. Dr. Fowler said that in that local experience there was no contraindication to concurrent appendectomy, and it was thought that the additional step should be taken when diagnostic exploration was made through a right iliac incision. Although he did not recommend diagnostic paracentesis for previously normal patients, he thought that an exception might be made in the case of infants. In infancy, the diagnosis was unfortunately often made late, and a very sick baby with abdominal distension might present. He thought that diagnostic paracentesis might, in some of those cases, be a preferable alternative to laparotomy, and he sought the opinion of other speakers on that matter.

Dr. H. WILLIAMS, in opening the discussion on Dr. Fowler's paper, said that he agreed with the larger number of points made by Dr. Fowler, and considered that the most important point was the decision whether the peritonitis was primary or secondary. He thought that there were three groups which had to be considered. The first comprised those cases occurring in infancy; the most striking physical findings in that group were vomiting and an abdomen which felt tumid. Peritonitis should be suspected; but it was probably safer to perform exploratory laparotomy in cases such as that. Dr. Williams himself had no experience of paracentesis in that group. The second group was that in which obvious ascites had been present for weeks and months, and that had changed to peritonitis. Often the only clinical change was the presence of fever and malaise. If there was no other explanation for those two findings, the chances were that peritonitis had supervened, and it was probably quite safe to treat such patients with chemotherapy. Some of those patients would develop abdominal pain or tenderness; but if there was no clear-cut evidence to suggest appendicitis, then probably paracentesis had a place. In the third group there was much more difficulty in arriving at a precise diagnosis on clinical examination. There were cases in which abdominal pain and vomiting were present in a previously healthy child. Dr. Williams said that there would always be a difference of opinion about the management of those cases, but he thought that it was probably safer to perform a laparotomy in all of them.

Dr. D. SHELCHT asked Dr. Fowler whether he advocated aspiration in all patients not subjected to laparotomy, in order to obtain the organism and test its sensitivities. He also asked whether Dr. Fowler considered that in cases of *Bacterium coli* peritonitis the organism came from the bowel.

Dr. Fowler, in reply to the latter question, said that he did not know. He thought that the condition was more likely to be bacteremia. In answer to the first question, he said that a diagnosis had to be made, and therefore all patients underwent either laparotomy or paracentesis.

Dr. R. HOWARD said that he regarded paracentesis as quite a safe procedure in a baby, and that he would be quite happy on occasions to needle the abdomen and inject large amounts of antibiotics. He did not think that all patients in that age group needed to be subjected to laparotomy, but he agreed that all older patients must have a laparotomy and be regarded as suffering from appendicitis till proved otherwise. He thought that the morbidity was greater if the

appendix was removed at laparotomy, and on occasions a faecal fistula would occur. That did not happen if the appendix was left *in situ*. He agreed with Dr. Fowler's comments about drainage of the peritoneal cavity. He thought it was useless, and sometimes dangerous, as adhesions might form locally. He said he would like to know the explanation of the higher number of cases of pneumococcal peritonitis in females.

Dr. Fowler said that he thought there probably was a case for introducing antibiotics into the abdomen through the paracentesis site in patients who were desperately ill, and empirically in the treatment of the infant, but in the average case he thought the procedure was probably not of great value. With regard to fistulae, Dr. Fowler said that there were three cases in the series. In two the fistula had followed the removal of the appendix, one of the patients having had a drain tube inserted. However, one fistula occurred in a patient in whom appendicectomy had not been performed, but a drain tube had been inserted. Dr. Fowler also said that it was not really known why there was a greater proportion of pneumococcal peritonitis in females. It had been shown that ascending infections could occur, and this had been produced in monkeys.

Dr. P. JONES said that he had seen three cases in infants in the first week of life; in all three the abdomen had been grossly distended and there was shifting dullness. Aspiration had been carried out and penicillin instilled. Dr. Jones asked Dr. Fowler whether he had been through all the cases of acute appendicitis in the records, because there he might find more cases of primary peritonitis; sometimes a red appendix was found with the presence of pus in the peritoneal cavity. Those cases might have been recorded as appendicitis.

Dr. Fowler said that he had not been through all those cases, but had only looked through the coded cases of local and general peritonitis.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

EXIT THE DEAN.¹

[From *The Australasian Medical Gazette*, November, 1883.]

LINK by link the chair which bound the Hon. John Smith M.D. of the Sydney University to the profession of medicine is being broken. Not long since it was discovered that he had never been re-elected Dean at the end of his triennium: this being so Professor Stuart was chosen. Consequently when the Medical Bill was being discussed, he, after all, was not Dean of the Medical Faculty, though still an examiner in medicine. The profession in New South Wales is thus relieved of the opprobrium of having had the head of its Medical School in active opposition to a fair attempt made for the legal regulation of its practice. His examinership is now gone, the Senate voting him a letter of thanks on its cessation—at the same time raising his salary for doing half the work he used to do. We want to know why he should be thanked and we want to know why more public money should be paid for less work.

[The reference here is to Professor Smith's opposition to the medical Bill of 1875, which imposed restrictions on unqualified practitioners. The Bill did not become law, but a similar Bill was brought forward in 1883. John Smith, M.D., although a medical graduate, occupied the chair of physics and had never obtained registration. In the course of a speech in the Legislative Council in 1875 he said:

A practitioner becomes skilful not by lectures and examinations, but mainly by cultivating his powers of observation. To this end the senses must be cultivated, but over and above that, there is a natural power of insight, a kind of divine gift which some men possess and others never attain. We all know that among doctors there is a great difference in the faculty of

detecting disease, a faculty not to be acquired by mere book study, and sometimes possessed by men who have not gone through a regular course of training. Thus we have unqualified persons in the medical profession—it is to be hoped not many—persons who have mistaken their vocation—but while the fact remains it is impossible to make the public discriminate between the qualified and the unqualified by means of legislative enactments. They must learn to discriminate by their own common sense and observation.

Surely an extraordinary pronouncement from the Dean of the Faculty.]

Correspondence.

A CASE OF MYXEDEMA COMA.

SIR: I was interested to read the account of a case of hypothermic myxedema coma by Dr. Knyvett and Dr. Steinbeck (M. J. AUSTRALIA, May 25, 1957), and to learn that this condition may occur in a subtropical climate. All 13 previously recorded cases developed during the rigours of the British winter. Their report further illustrates the grave prognosis in such advanced stages of hypothyroidism irrespective of the mode of therapy employed.

In my view the administration of potent thyroid hormones is by no means an ideal solution. Simple warming of the comatose patient by a water-bath or electric cradle is sufficient to raise body temperature from the region of 75° to 80° F. to normal or near normal levels. This rise in temperature is paralleled by a rise in metabolic rate. Any further sudden rise in body metabolism, such as may result from parenterally administered thyroid hormone, is fraught with danger, and is an example of the proverbial whipping of the tired horse. It is well known that the myxedematous heart is abnormally susceptible to thyroid hormone; cardiac arrhythmias and myocardial infarction have occurred in patients whose initial dose of thyroid hormone was incautious.

With such considerations in mind, I refrained from using thyroid hormone in the case reported recently from Belfast by Dr. McCaughey and myself.¹ Body heating by immersion in a warm bath was sufficient to restore our patient to almost normal temperature and concurrently to full consciousness. Her death seven days later from a hitherto unknown complication of endogenous hypothermia could have been in no way prevented by prompt administration of thyroid hormone.

In contrast, Dyson and Wood² treated their patients with 3·2 milligrammes of triiodothyronine intravenously over a period of four days, in addition to other accepted therapeutic measures. This dose is equivalent to about five grammes (150 grains) of thyroid extract. They claimed improvement following the initial 1·2 milligrammes, but their patient relapsed within twenty-four hours, failed to respond to subsequent doses, and died.

In a discussion of these latter cases *The Lancet*³ stated: "One school of thought regards huge doses of the most potent hormone as potentially life-saving; the other considers that even modest doses may be lethal. . . . In the absence of satisfactory evidence most physicians will probably steer a middle course."

The basis of the electrolyte disturbance which is a feature of myxedema coma, and which was noted in their case by Knyvett and Steinbeck, is probably complex. Adreno-cortical failure is recognized as a complication of advanced untreated myxedema. Hubble,⁴ Marshall and McCaughey,⁵ Staland and Lerman⁶ will explain the hyperkalemia, hyponatremia and hypochloremia. Impaired renal function, resulting from hypotension and low cardiac output, is a contributory factor. Yet another mechanism was demonstrated in the case reported by McCaughey and myself. Prolonged hypothermia, probably in combination with a critically low muscle blood flow, had caused extensive rhabdomyolysis (similar to that found in paralytic myo-

¹ *Ann. Int. Med.* (1956), 44: 376.

² *Lancet* (1956), 2: 757.

³ *Lancet* (1956), 2: 768.

⁴ *Lancet* (1955), 1: 1.

⁵ *Lancet* (1956), 2: 754.

⁶ *J. Clin. Endocrinol.* (1950), 10: 1401.

¹ From the original in the Mitchell Library, Sydney.

globinuria and in "trench foot"), with liberation of myo-haemoglobin and (presumably) potassium into the circulation. Further, the renal tubular obstruction by myoglobin casts and the renal tubular necrosis added to the derangement of water and electrolytes and was in fact the ultimate cause of death.

The occurrence of large bruises over the body of the Brisbane case also interested me. In our patient there were extensive ecchymoses on the forearms and legs and deep bruises on the trunk and thighs. Full blood examination revealed no abnormality of the coagulation factors, platelets or serum protein fractions. The bleeding tendency in these patients may also be due to the direct effects of prolonged hypothermia on the vascular walls.

Yours, etc.,

Baker Medical Research Institute, R. J. MARSHALL.
Alfred Hospital,
Melbourne.
May 30, 1957.

4. I personally have not used "Terramycin" for longer than four months, but I am interested to hear of the experiences in Edinburgh.

5. By and large, I am not in favour of single-drug therapy; but in "closed" lesions, where secretions have been negative for some months, the use of INAH alone is probably justified.

Yours, etc.,

P. R. BULL,
Medical Officer in Charge,
Thoracic Unit.

Austin Hospital,
Heidelberg,
Victoria.
June 4, 1957.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

THE Post-Graduate Committee in Medicine in the University of Sydney has announced the names of the successful applicants who have been appointed by the Senate of the University of Sydney for two Post-Graduate Training Fellowships in Medicine for 1957.

Dr. David Howell, who was awarded a Fellowship for twelve months in 1956, has been granted an extension of his Fellowship for a further period of six months. He will continue his study of the use of radioactive isotopes in medicine, especially as applied to the field of obstetrics and gynaecology, at the Post-Graduate Medical School of London, Hammersmith.

Dr. M. H. Cass has been awarded a Fellowship for a period of twelve months, to work under the direction of Sir Russell Brock in the Thoracic Research Unit at Guy's Hospital, London. The work in this unit will be mainly associated with the experimental investigation and clinical application of heart bypass and pump oxygenators. Dr. Cass's particular interest is elective cardiac arrest, intimately

SIR: Dr. Marks states that he hesitates to join issue with me, but I feel that there is really no controversy.

The purpose of my paper was not to cover every aspect of the chemotherapy of tuberculosis, but to state briefly the main principles in order to start a discussion.

I will endeavour to answer his points in sequence.

1. Sterilization of lesions with chemotherapy. I stated that this is not achieved in many cases, but agree that with adequate chemotherapy given for sufficient time a large percentage of "closed" lesions will be sterilized; my plea is for proper chemotherapy.

2. Failure to take adequately prescribed chemotherapy is a very real cause for therapeutic failure.

3. Animal experiments suggest that the alternative form of PAS mentioned is effective, but I agree that no large-scale trials on human subjects have been carried out.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JUNE 1, 1957.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	1	6	..	..	..	..	..	8
Amoebiasis .. ..	..	..	..	..	..	..	..	..	..
Ancylostomiasis .. ..	..	..	..	..	..	..	..	..	..
Anthrax .. ..	..	..	..	..	..	..	..	..	..
Bilharzias .. ..	..	..	..	..	..	..	..	..	..
Brucellosis .. ..	..	..	..	..	..	..	..	..	..
Cholera .. ..	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1	..	..	..	..	..	..	..	1
Dengue .. ..	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile)	2(1)	15(14)	2(2)	..	..	..	1	..	20
Diphtheria	1	2(2)	..	..	2(2)	..	..	..	5
Dysentery (Bacillary) .. ..	..	..	1(1)	..	2(2)	..	..	..	3
Encephalitis .. ..	..	..	..	..	..	..	..	..	..
Filariasis .. ..	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice .. ..	..	..	..	..	..	1	..	..	1
Hydatid .. ..	..	..	..	2(1)	8(2)	2	..	1	82
Infective Hepatitis	41(19)	23(12)	..	..	..	..	..	..	..
Lead Poisoning .. ..	..	..	..	..	..	..	..	..	..
Leptospirosis .. ..	..	..	2(1)	..	..	..	..	..	2
Malaria .. ..	..	1	..	..	..	..	7	..	8
Meningococcal Infection	2(1)	1	..	..	..	..	..	..	3
Ophthalmia .. ..	..	..	..	..	2	..	..	..	2
Ornithosis .. ..	..	..	..	..	..	..	..	..	..
Paratyphoid .. ..	..	..	..	..	..	..	..	..	..
Plague .. ..	..	..	..	..	..	..	..	..	..
Polioomyelitis .. ..	..	..	..	..	..	..	..	..	..
Puerperal Fever .. ..	..	1	..	..	..	..	..	..	1
Rubella .. ..	..	33(25)	..	10(9)	3	..	..	..	51
Salmonella Infection .. ..	..	..	..	..	..	..	..	..	..
Scarlet Fever	14(8)	19(14)	5(1)	15(9)	1(1)	..	..	..	54
Smallpox .. ..	..	..	..	..	..	..	..	..	..
Tetanus .. ..	..	1	..	..	1	..	..	..	1
Trachoma .. ..	..	..	..	..	..	..	..	..	..
Trichinosis .. ..	..	..	..	..	..	..	..	..	..
Tuberculosis	20(12)	12(11)	12(6)	5(4)	7(6)	3(1)	..	..	60
Typhoid Fever .. ..	..	..	2	1(1)	..	..	..	..	3
Typhus (Flea-, Mite- and Tick-borne) .. ..	..	..	1(1)	..	..	..	..	..	1
Typhus (Louse-borne) .. ..	..	..	..	..	..	..	..	..	..
Yellow Fever .. ..	..	..	..	..	..	..	..	..	..

¹ Figures in parentheses are those for the metropolitan area.

associated with the practical application of the heart-lung machine to clinical cardiac surgery.

Post-Graduate Conference at Wollongong.

The Post-Graduate Committee in Medicine in the University of Sydney announces that, in conjunction with the South-Eastern Medical Association, a post-graduate conference will be held at the Wollongong General Hospital on Saturday and Sunday, July 20 and 21, 1957. The programme is as follows:

Saturday, July 13: 2 p.m., registration; 2.15 p.m., "Complications in Association with Cesarean Section", Dr. J. Greenwell; 3.30 p.m., "Anemia in Practice", Dr. R. J. Walsh; 4.15 p.m., "Diagnosis and Management of Acute Abdomen", Dr. S. J. Goulston.

Sunday, July 14: 9.30 a.m., "Ante-Partum Hemorrhage", Dr. J. Greenwell; 10.45 a.m., "Blood Transfusion", Dr. R. J. Walsh; 11.30 a.m., "The Mouth as the Mirror of Disease", Dr. S. J. Goulston.

The fee for attendance is £3 3s., and those wishing to enrol are requested to make early application to Dr. Hugh E. Marsden, Honorary Secretary of the South-Eastern Medical Association, Keira Street, Wollongong. Telephone: Wollongong B 2050.

Medical Prizes.

THE MEDICAL WOMEN'S SOCIETY OF NEW SOUTH WALES ANNUAL PRIZE.

THE following are details of the Medical Women's Society of New South Wales Annual Prize:

1. The Medical Women's Society of New South Wales shall award a prize of the value of 25 guineas, open to any medical woman registered in New South Wales.
2. The prize shall be awarded for an original contribution on a subject of medical interest published or ready for publication during that year.
3. In the event of a contribution by two or more medical women in collaboration the prize shall be divided equally between the contributors. Work done in collaboration with other than medical women may be submitted.
4. The Medical Women's Society of New South Wales shall appoint examiners, and the award will be made on their recommendation in the month of February each year.
5. The closing date for entries shall be November 30 of each year.
6. The prize shall not be awarded if either the examiners or the committee of the Society consider that the standard of the work or works is not sufficiently high to justify the award of the prize.

PRIZES FOR MEDICO-SURGICAL FILMS.

At the conclusion of the public meeting held on April 9, 1957, by *La Presse médicale* at the new *Faculté de médecine de Paris* for the award of prizes for medico-surgical films, the following results were announced by Professor Cathala:

Prize for a French film: P. Wertheimer, J. Sautot and J. Joubert, of Lyon ("Heterogenous Arterial Grafting", colour film).

Prize for films from other countries: P. Thorek, of Chicago ("Atresia of the Esophagus with Tracheo-esophageal Fistula", colour film).

Cups to producers of other films: G. Bizard and J. Vanlerenberghe, of Lille ("Study of Biliary Secretion by Means of a Technic with Infusion into the Rat Liver", colour film); Van Stolk, of Rotterdam ("Volkmann's Contracture", colour film); J. Teinturier, of Casablanca ("Induced Cardiac Arrest and Bloodless Ventriculotomy under Hypothermia").

Honours.

BIRTHDAY HONOURS.

HER MAJESTY THE QUEEN has been pleased to confer the following honours on Australian medical practitioners:

Major-General Frank Kingsley Norris has been created a Knight of the Most Excellent Order of the British Empire.

Professor Arthur Barton Pilgrim Amies and Professor Gordon Roy Cameron have been created Knights Bachelor. Dr. Archibald Simpson Anderson has been created a Commander of the Most Excellent Order of the British Empire.

Dr. Thomas James Biggs and Dr. Benjamin Thomas Edye have been created Officers of the Most Excellent Order of the British Empire.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Sharrock, Keith Douglas, M.B., B.S., 1954 (Univ. Sydney), 10 Charleville Road, South Wagga, New South Wales.

Tinsley, Richard William, M.B., B.S., 1956 (Univ. Sydney), 7 Alpha Road, Lane Cove, New South Wales.

Deaths.

THE following deaths have been announced:

ENGLAND.—Theodora Margaret England, on June 9, 1957, at Lewisham Private Hospital, New South Wales.

NIHILL.—Robert Nihill, on June 7, 1957, at Coonabarabran, New South Wales.

Diary for the Month.

- JUNE 25.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 26.—South Australian Branch, B.M.A.: Annual Meeting.
JUNE 26.—Victorian Branch, B.M.A.: Branch Council.
JUNE 27.—New South Wales Branch, B.M.A.: Branch Meeting.
JUNE 28.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 185 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 88 L'Estrange Terrace, Kelvin Grove, Brisbane): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

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MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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